The Builder.

VOL. LXXXIII.—No. 3111. SEPTEMBER 27, 1902.

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Notes on Franciscan Architecture.

HARDLY a country exists from China to Peru where the two great orders of the Franciscans and Dominicans are not represented by communities of Friars occupying buildings which reproduce to a great extent the parent institutions of Mediæval Italy. The picturesque "Missions" of California, the venerable convents of Goa, date back almost to the Middle Ages, and form links in the monumental history of one of the most extraordinary of religious ideals. The vast organisation of the Friars—which is still a living one—has had as great an influence on art at a certain period as the older and now comparatively dead institutions of Cistercian or Benedictine Monks. But any general account of architecture as influenced by the greatest of the two Mediæval Orders would occupy space far beyond the limits of our columns, and we must, therefore, confine our attention to the single architectural province of Italy and the development of its mediæval art.

The sudden spread and popularity of the Franciscan religion in North Italy immediately on the death of Francis (October 4, 1226) was very remarkable. Few, if any, religious movements have ever met with such success within so short a period, or left behind such imposing monumental evidences. The Order was founded in 1212, and before the close of the thirteenth century most of the huge churches which form the most conspicuous of landmarks in modern Italy had already been built by the Franciscan architects.

The beginning of the thirteenth century marks a turning point in the artistic history of Italy. Up to that date the older collegiate and monastic communities had been content with cathedrals and abbey churches built in the ponderous round-arched style which we call Romanesque; after that date the system of building with the pointed arch and vault became general, and it would seem that this change in taste is in a manner connected with the Franciscan Order, and the building of the new kind of churches for that Order in which it is exclusively used in the thirteenth century. The amount of building commissioned by the Franciscans during that period of singular artistic activity was prodigious. In the earlier years of the century every Italian town, great or small, would seem to have set about establishing a convent of the new Order within its boundaries, and the inevitable churches had to be built. These churches—with the solitary exception of Ara Cœli in Rome, which happened to be an old basilica adapted for the purpose—are invariably in the style of the pointed arch.

The accompanying comparative chronological table of a few of the more important Franciscan churches gives some idea of the influence exercised upon art by this great organisation, and serves to prove how very much the principal "Gothic" buildings in the same towns owe to the fashion set by the Friars. The dates of the great cathedrals are almost invariably subsequent to those of the Friar's churches.

Dates of Early Franciscan churches compared with Cathedrals, &c., in principal Italian cities (in the "Gothic" style):—

Naples: S. Chiara (Fran. ch.), 1280. Cathedral, 1314.
Siena: S. Francesco, c. 1225. Cathedral, 1340.
Florence: S. Croce (Fran. ch.), 1294. Cathedral, 1300.
Bologna: S. Francesco, 1236. S. Petronio, 1388.
Perugia: S. Francesco, Assisi, 1228. Cathedral, 1277.
Prato: S. Francesco, 1290. Cathedral, 1300.

Tuscany may be regarded as the chief architectural district south of the Alps for the pointed style. In the vast plains of the meandering Po the ponderous Lombard style, with its round brick columns, obtusely pointed arches, and heavy depressed outlines, continues the traditions of Romanesque art into the later Middle Ages, and with but few modifications induced by the later styles. The architectural district of Lombardy forms a barrier of the older brick architecture between the developing school of Tuscan mediæval art and the still more vigorous styles of the north of Europe. It is difficult, if not impossible, to identify the invention or discovery of the pointed style of construction with any particular architectural district of mediæval Europe. Like most changes in fashion and taste, an architectural style spreads very rapidly, and although the means of communication between distant parts of Europe could not be measured in mediæval days, as in the present, by hours, there is no reason to suppose that the itinerant workers would take longer on their travels than the many who still travel on foot at the present day.

St. Francis had been dead but a couple of years when his enthusiastic followers set about building the famous and central monument of the Italian Gothic style over his his grave at Assisi—a monument whose magnificence was hardly appropriate to the memory of the lover of poverty. According to Vasari, the double church of Assisi was commenced in 1228, but its consecration would not appear to have taken place until 1253. This remarkable building embodies all the chief characteristics of the Italian Gothic. The extreme simplicity of constructive features, the wide spaciousness of the interior, and the tall narrow windows, are what we may see in all Italian churches of the thirteenth and fourteenth centuries. The extreme height of the windows seems almost to anticipate the extravagant ideas of German architects at a far later date.* We may perhaps be allowed to call the church at Assisi the "Cor Cordium" of the special Franciscan type of architecture and incidentally of the Italian Gothic style. Its elegantly-designed proportions and rich detail harmonise with the painted decorations which crowd every available space; and the rich glowing windows, many apparently of contemporary workmanship, give a particular splendour to a building in a country where such a mode of decoration is somewhat remarkable from its infrequency. The cathedral of Arezzo shares this latter distinction with the church of Assisi, although the glass is of a far later and a different character.

Every district or national type of architecture culminates, as a rule, in some particular building or buildings. The French geometrical style is perhaps best represented by the Sainte Chapelle of Paris. England has its Westminster Abbey, and Germany its Cologne Cathedral. In Italy the Gothic style was of short duration compared with northern countries; it began to be used at

* The tomb house of Francis has been claimed by different French and German archæologists as the work of some northerner resident in Italy—so strange does it seem to some minds that a true "Gothic" style should ever have had a natural origin in the classic soil of Italy. But such theories and ideas betray a considerable ignorance of the country during and since the middle ages. As a matter of fact few districts of northern Europe have more imposing "Gothic" remains than Italy.

Santa Maria Gloriosa dei Frari, Venice.

S. Francesco Assisi.

the very beginning of the thirteenth century, it was superseded by the Early Renaissance about the year 1377—the year of Filippo Brunelleschi's birth. And of all the numerous Gothic buildings carried on during this century and three-quarters, the church at Assisi is one of the most representative. Like the Sainte Chapelle of Paris, it commemorates a religious enthusiasm which also found a means of expression in artistic development—a development which took the form of that brief but brilliant "Gothic" period of the days of Dante, Giotto, and Nicolo Pisano.

In other districts of the Peninsula the Franciscan influence may be studied with interesting results. In Southern Italy—the ancient kingdom of Naples—some of the most imposing of churches were built in the first years of the Franciscan era. Santa Chiara, Naples, is one of the largest "hall-churches" in existence — but, alas! its "Gothic" character, which must have been particularly interesting on account of its scale, is completely smothered beneath the tawdry plaster decorations of the seventeenth century. All the ancient churches of this most interesting district have suffered so much from the Jesuit atrocities that the most enthusiastic student cannot but feel repulsed by the overpowering effect of squalor and grimy neglect, added to the vulgar frippery of modern days.

In North Italy a special interest attaches to the very beautiful church of S. Francesco at Bologna. This seems to have been one of the earliest Franciscan churches planned. Its large proportions, the chevet of encircling chapels at the east end, and the flying buttresses, remind one of the characteristics of Central Europe. Its early date (1236) illustrates the very early development of the pointed style in Italy. This church has also a particular interest in connexion with the building of S. Petronio in the same city. That instance of misplaced confidence in a posterity which failed to carry on a colossal project (S. Petronio was to have been the largest church in the world) owes very much in general proportions and detail to the older edifice.

"The Coming of the Friars" synchronises with the advent of the "Gothic" style in Italy and perhaps in other parts of Europe. As to how far the two facts have any relationship it would be difficult to define. It is at least reasonable to suppose that many of the great "Gothic" cathedrals of the peninsula owe their existence to a spirit of emulation with the older designs of the friars. They are invariably later in date—so much later, in fact, that, with a few exceptions, like that of Orvieto, they were finished in Renaissance times.

At the present day Italy is the only country where we can study the "Gothic" churches of the friars to any great extent. In other countries, partly owing to reformations and revolutions and the pulling down of churches which could not be turned into cathedrals or parish churches, such buildings have become rare. In London, for example, the Friars' Church (300 ft. long) which stood near Newgate has completely disappeared. We are therefore unable to appreciate the influences which the order may have exercised over art in more northern climes. In Italy, every little town still possesses its Franciscan convent, and almost in every case traces of Gothic tradition may be detected, unless where the building is manifestly of more modern origin. Italian parish churches, as a rule, belong to a much older date, or they have been built or rebuilt in comparatively modern times. The cathedrals and the Franciscan churches are the monuments which always represent the Gothic period in an Italian city.

The immense development of the conventual and monastic modes of life during the thirteenth century had much to do with the spread of the pointed style in the building of cathedrals and parish churches. The immense preaching houses of the Dominicans and Franciscans came to be fashionable models, in [the same way as the religious practices of the Friars were considered the highest form of religion, and worthy of general imitation. The pointed arch introduced ideas which were quickly taken up and applied to all the churches then in course of building, and in place of the irregular and often eccentric planning and detail of the twelfth and preceding centuries a type of building was introduced, and became traditional all over Western Christendom, which has for its keynote a cross. The Roman basilica, the square Byzantine hall, the still older circular plan, became things of the past, and it may be said that for three centuries no churches were built except on the stereotyped cross plan introduced by the Friars in about the year 1200.

After the sixteenth-century architects allowed their brains to run riot in eccentricities of plan until the force of ugliness could no further go in the absurdities of the "barocco." Many of these circular, octagonal, square, and other forms of churches, which became common in the seventeenth century, seem at first sight the survivors of the earlier types, but in reality they are merely wanton protests against the severe rigidity of earlier times and a purer taste.

Important "Gothic" cathedrals belonging to the fourteenth century are:—Palermo (c. 1400), Orvieto (1290), Lucca (1388). These all evidently owe their pointed architecture to the influence of the Friars' churches built in their neighbourhood during the thirteenth century.

THE SONNING BRIDGES.

THE correspondence which has taken place in several papers in regard to the proposed demolition and re-building of the old bridges at Sonning, and the public interest manifested in the subject, induced us to pay a special visit to the place in order to examine the condition of things at first hand.

The bridges numbered 1, 2, and 3 in the accompanying views run in a line with each other in the order of numbering, all of them carrying the main road across the river and its backwaters from the Berkshire to the Oxfordshire side. The village of Sonning (or "Sunning" as it is called in old guide-books) lies entirely on the Berkshire side, though the parochial boundary includes land on both sides of the river. Starting from Sonning, we come first on the brick bridge which spans the main stream, a structure familiar in many paintings, notably in one of the most beautiful and delicate of Alfred Hunt's oil-paintings, and in more than one,

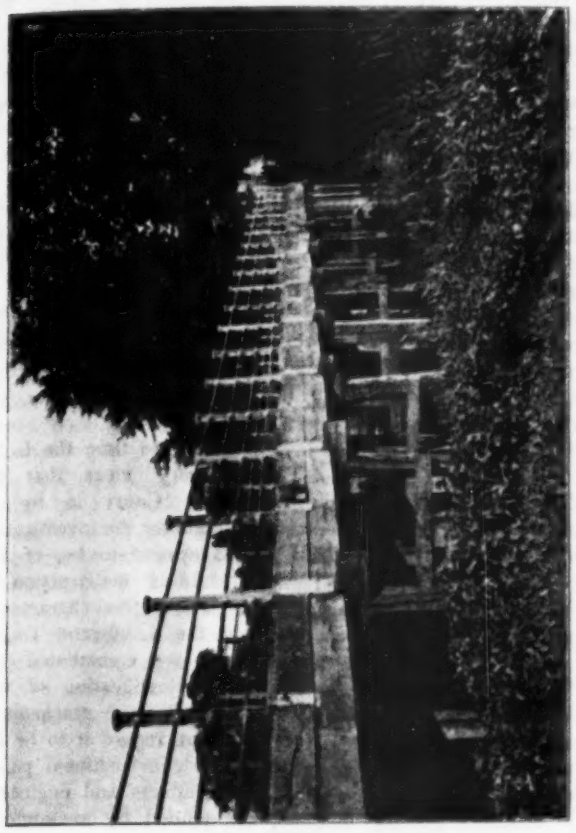


Fig. 2.—Bridge below Wood Mill.

Fig. 4.—Horse Bridge at Junction of Pack-water with Main Stream.

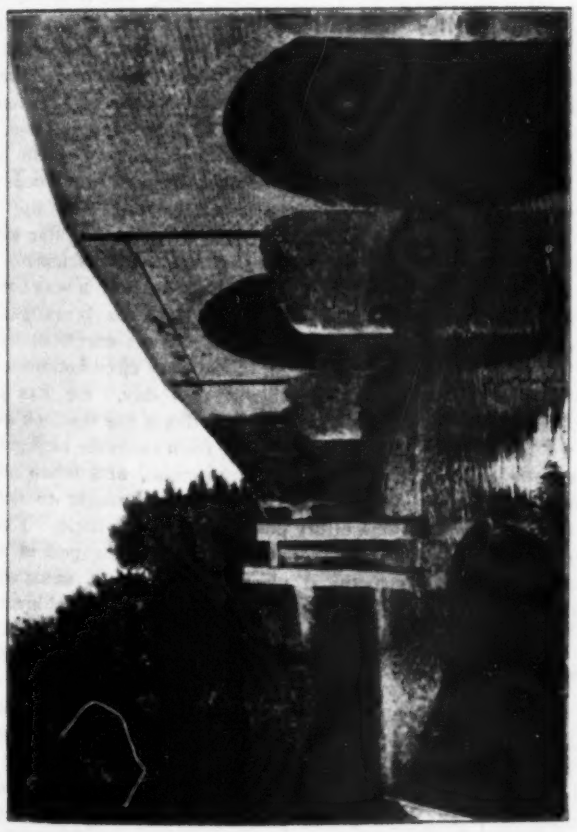


Fig. 1.—Main Bridge: up-stream side (looking towards the Oxfordshire bank).

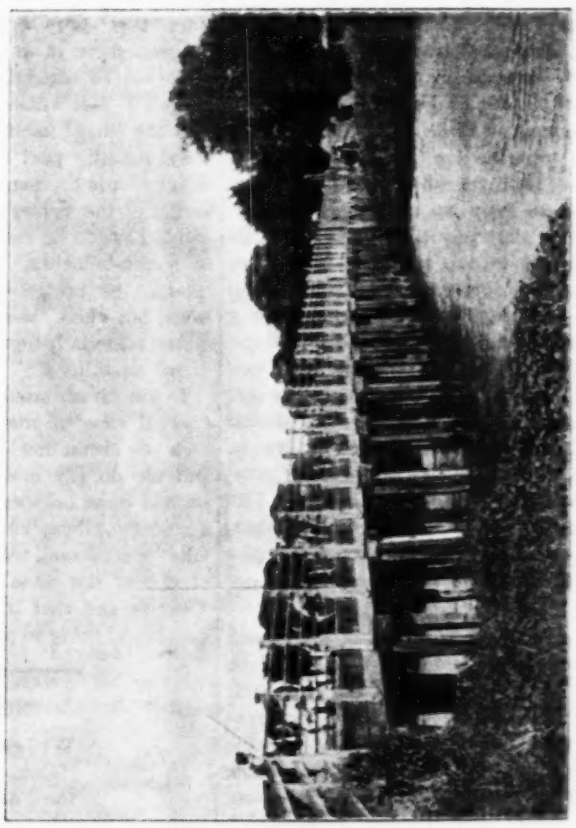


Fig. 3.—Bridge over Back-water, Oxfordshire side.

The Sonning Bridges.

if we remember right, of his water-colours. It is a plain brick-built bridge with what would now be considered a very steep gradient, though not steep enough to be a serious inconvenience to ordinary traffic. It is built with one comparatively high and wide arch in the centre, forming the chief water-way, and a series of lower and narrower arches on each hand, four on the Sonning side and six on the Oxfordshire side. It is one of those old bridges in which the difference between up-stream and down-stream side is frankly recognised in the construction; the up-stream side, shown in our view, having large cut-water buttresses, while the down-stream side shows only the flat pilasters. We have not come across any record of its precise date; but though spoken of as an old bridge it cannot be of very great age, since it is described in Brayley and Britton's "Beauties of England and Wales" (1801) as "a plain modern structure of brick, well adapted for convenience and durability." Following on in the same direction we come on to the bridge No 2, over the sluice below the large water-mill known as Wood Mill. After this the road passes over some partly modern and partly old bits of brick bridge or causeway (for this portion runs rather over land than water), and comes on to the wooden bridge No. 3, spanning the backwater which sweeps round in a curve here to join the main stream just opposite the White Hart at Sonning. The horse-bridge, No. 4, crosses the lower end of this backwater, from the Oxfordshire end of the main bridge to the left bank of the stream. This latter bridge belongs, we understand, to the Thames

Conservancy; it is merely a bridge for foot passengers and for leading horses across when necessary; it appears to be in fairly good condition and quite adequate for its present purpose; and we are not aware that there is any intention to interfere with it. The other two wooden bridges are under the jurisdiction of the Oxfordshire County Council; the main bridge is presumably the joint property of the Oxfordshire and Berkshire authorities, as the division line of the counties falls in the centre of the main stream.

With regard to bridges No. 2 and 3, there can be no doubt that they are very picturesque, save and except their balustrades, which are very commonplace iron castings—standards and cylindrical rails,—undoubtedly later additions to the structures, to replace wooden railings which had become insecure. It is odd that none of the people who have written indignant letters about the destruction of these bridges have noted this fact; although we are quite sure that if these iron railings were being put up now, as new ones, we should hear a great deal about the vandalism of destroying the character of the old wooden structures. That is the kind of way that defenders of the picturesque weaken their own case by not being sufficiently frank. The timber structure is undoubtedly picturesque; the railings are not; but at a little distance they are not obtrusive.

There can be no question that the timber bridges require rebuilding, and that without delay, even for ordinary traffic. The dilapidated state of the timber supports can be recognised even in these small photographs. So far we are with the County Council. It is no use shutting one's eyes to facts, and trying to keep up a rotting structure because it is picturesque, and we regret its loss. But as to the proposal to replace them by the ordinary style of engineering steelwork—lattice girders and so on, nothing which has been said on that subject is one whit too strong; in fact, nothing has been said that to our mind is strong enough. Sonning is a place of quite exceptional beauty; of that quiet serene beauty of English landscape which finds so many illustrations on the banks of the Thames. The whole place, with its flower-covered cottages, secluded churchyard, and the wooded banks of the river, seems, in Tennyson's words—

"A haunt of ancient Peace."

To place over the backwaters of the stream iron girders of the ordinary type would be to ruin the whole character of the scene. It is true that these bridges are on the opposite side from the village, but they form the approach to it, and close to them is the French Horn Hotel, with its quiet old house and beautifully kept garden, from which these proposed engineer's bridges will be prominent objects.

This ought to be stopped. The bridges ought to be rebuilt, but there is no kind of necessity to rebuild them in the way proposed. Under the Wood Mill bridge there is no water traffic whatever; it is the tail-race from the mill dam. Under the No. 3 bridge there is no water traffic to speak of; an occasional canoe may wander down the backwater, but it is not a river highway. There is therefore not the slightest excuse for erecting a one-span steel girder from supports on each bank. We do not advocate the use of wooden piles again; there is the question, it must be remembered, of making the high road adequate for such things as traction engines, at present interdicted, here as on so many other country bridges. But simple piers of brick or stone (only not Staffordshire blue brick, some of which we see are on the ground already), placed pretty near to each other in the stream—there is no occasion, as before observed, to keep the waterway entirely open here—with oak beams laid across them, would form a style of bridge adequate for anything that is required, and not in the least at variance with the character of the scene (wooden balustrades might be designed which would be far more pleasing and more in keeping than the present iron castings); whereas the painted steel lattice girders would just ruin it.

In regard to the main bridge, it is quite sufficient at present for ordinary traffic; but there is the question again of providing for the heavier loads which now pass along country roads. To meet these it would have to be rebuilt; but there is no reason why, whenever this is done, it should not be rebuilt on its present picturesque lines. The centre arch might be a little widened, but there is no occasion that it should be much wider; it is sufficient for the river traffic now, and whatever the stream may be in winter (when people do not go boating), in summer it so shallow where the smaller arches are, at all events on the Sonning side, that the waterway could hardly be used there in any case. The gradient need not be altered, and could hardly be altered in fact without extending operations into the village itself, and raising the whole street running past the White Hart, which falls towards the bank of the river; and the height of the centre arch above the stream would have to be maintained in these days of steam-launches. It might be better to rebuild the bridge of stone rather than of brick, but there would be no occasion to depart materially from its present exceedingly picturesque lines.

It will be admitted that we have taken no bigoted view of the matter; we make no plea for retaining dilapidated structures. But we do say most emphatically that to rebuild these bridges in the average style of a modern railway viaduct, which is evidently what is proposed, would ruin the character of one of the most beautiful spots on the Thames, and that it is a perfectly heartless and brutal thing to propose.

NOTES.

Liverpool Cathedral.

WE give, under the head of "Competitions," the Report of the Assessors on the preliminary competition for Liverpool Cathedral. It is rather a weak document, and does not enter seriously into the question of what a twentieth-century cathedral should be. We quite agree that the designs in the Classical spirit which were sent in were not of much account, though we see that one of them, No. 94, is included in the list of "honourably mentioned"; a distinction which it seems to have owed rather to the size and finish of the drawings than to any important quality of design. Among those which were mentioned with special commendation in our article of July 26, No. 68 is included among the five selected, and Nos. 37, 41, 45, and 46 among the "honourably mentioned." We regret that no position has been given to Nos. 23 and 53, (we do not know the authorship of either); the author of No. 53 especially showed a great deal of thought and originality in his design; but the inclination seems to have been to favour designs in orthodox English Gothic in preference to any attempt at originality of style or plan. This is obviously what the Committee wanted, so they will probably be satisfied with the result. Five is a small number to select for so important a competition, and one or two of those who are omitted might certainly have had a fair claim to share in the final competition.

Coroners and Technical Inquests.

FROM time to time the fact is made very clear that the Coroner's Court is by no means a proper tribunal for the investigation of accidents which appear to be, or are, connected with building construction or engineering work. The general character of the proceedings at the Loudwater Tunnel failure, upon which we commented last week, is a sufficient justification of this contention. No blame is to be attached to a coroner if he does not regard it to be his duty to settle knotty constructional points for the benefit of architects and engineers. His function, as defined by a statute of Edward I., is to go to the place where "any be slain or suddenly dead," and if it concern "a man slain, whether it were in any house, field, bed, tavern, or company," and whether the dead person "were known or else a stranger, and where he lay the night before." With the aid of a little imagination, a striking picture of life in early English history may be drawn from these words; a time when a man carried his life in his hand, and lost it with singular ease, perhaps in the course of discussion at his hostelry, or it might be on his way home. As an official charged with the investigation of crime, the coroner was an excellent institution; and so, in ordinary circumstances, he remains to the present day. He has primarily to discover if death has resulted from deliberate intent or from culpable negligence on the part of any person, and when sufficient evidence has been brought to determine either point, his duty is done. Therefore it happens that those engaged in constructional work often remain unsatisfied. What we now want is the establishment of a Commission having powers akin to those possessed by the Board of Trade in connexion with railway accidents, boiler explosions &c., to investigate all accidents, whether on private property or not, that may be directly connected with structural or engineering work. Much valuable information not at present forthcoming would thus be afforded for the future guidance of those engaged in such practice.

Workshop Philosophy.

IT is very important that the exact nature of processes conducted in the workshop should be understood, because knowledge of this nature leads directly to the invention and production of improved tools and appliances. One of the papers read at the recent meeting of the British Association contained some references to this subject, wherein the author explained the action of cutting tools used for metals, plastic and elastic substances, and wood. From a purely educa-

tional point of view, the phenomena thus exhibited are of considerable interest, but they are equally worthy of attention from practical men. The intelligent mechanic generally has to think of something during the execution of his work, and it would often be to his advantage to direct his thoughts upon things taking place under his eyes. Observation and reflection might then frequently result in the evolution of improved methods of work and consequent promotion or some equivalent benefit. Appreciation of the "flow of metals" has already led to various new processes in the treatment of materials by engineers. The solidification of metallic powders and chips is now possible, so that bars of metal can be obtained equal in all essential qualities to bars produced in the ordinary way. Milling cutters have recently been formed cold from blanks of tool steel by hydraulic pressure, metal sheets can be drawn in the press, and numberless small articles are satisfactorily produced in quick-acting drop presses. None of these developments are due to mere book learning, but are traceable to the habit of independent thought that ought to be encouraged in all concerned in mechanical work.

Modern Gas-Engines.

DURING recent years considerable attention has been paid to the perfection of internal combustion engines, which are theoretically far superior in efficiency to any form of steam motor that has been, or can be, devised. The realisation of theory in actual practice is not always easy, and in the case of a gas-engine it is difficult to utilise the high temperatures and pressures resulting from the inflammation and explosion of gas in the cylinder. So long as such motors were used chiefly in small sizes, the disadvantages of waste heat and pressure were largely counterbalanced by various practical advantages, and comparatively little incentive was afforded for efforts to attain higher efficiency. At the present time the sizes of gas-engines are being very largely increased, and the question of gas consumption is necessarily attracting far more attention. The application of producer gas has already exercised a most important influence in reducing the cost of fuel, and we have no doubt that a similarly satisfactory reduction will ultimately be made in the quantity consumed for a given duty. This is clearly a consummation to be desired, especially when we consider that natural conditions suitable for the development of mechanical power on a large scale are practically non-existent in the British Isles. Hence much dependence must be placed on the continued ingenuity and perseverance of the engineer. So far as gas-engines are concerned, a very remarkable development in the direction of size and power has taken place. In this country the first engines above 400 h.-p. were made in 1900, but since then two of the leading makers have built fifty-one gas-engines of powers between 200 and 1,000 h.-p. On the Continent the makers of the Cockerill engine of 600 h.-p., which we mentioned in connexion with the Paris Exhibition of 1900, have built an engine of 2,500 h.-p., and are now prepared to extend the power up to 5,000 h.-p., the average size of the engines built under their patent so far being 558 h.-p. Such another Continental firm has made thirty-two gas-engines, with an average of 1,390 h.-p. per engine; and two other firms have turned out fifty-one and twenty-eight gas-engines, of which the sizes average 400 h.-p. and 600 h.-p. respectively. In the United States a firm that has recently begun to build gas engines has turned out six engines of 1,000 h.-p., and is now constructing two gas-engine gas compressors of 4,000 h.-p. each. Other statistics might be quoted, but we have said enough to indicate the activity that is being displayed in this branch of industry. Of course, many of the largest engines are being worked under economical conditions not possible for every user, but experience is being gained which will ultimately be of advantage to the public at large.

The Edison Power Station, New York.

A REMARKABLE feature of mechanical engineering in the present day is the construction and equipment of mammoth establishments, such as the Edison Power Station, now in course of completion in New York. When the whole of the plant has been laid down, this station will have a maximum capacity of no less than 125,000 h.-p. Standing near the East River, the building occupies a site measuring 197 ft. by 272 ft., and includes a boiler house 79 ft. by 272 ft., with an adjoining engine house 118 ft. by 272 ft. The details of this plant are worthy of record, including as they do various novel and interesting features. The boiler house is divided into four stories, the roof of the building containing a coal-bin, capable of holding fully 10,000 tons of coal, for the conveyance of which from barges in the river to the bin a most complete mechanical plant has been devised. The sides of the bin slope at an angle of 45 deg. to the horizontal, and they are supported on deep lattice girders, while the weight of the receptacle and its huge load are carried partly on the side walls of the building, and partly on two lines of columns. Therefore, it will be seen that the American system of skeleton building has not been adopted in this case. In the two stories below the coal store there are fifty-six water-tube boilers, each of 650 h.p., and below the floor of each boiler-room ash-bins are fixed. This mode of fixing steam boilers on the upper floors of a building has been adopted before in the United States, but would be considered rather a novelty in this country, where boilers are looked upon as appliances that must be placed on solid earth. Stoking is provided for by steel-plate shoots from the coalbin to hoppers connected with the mechanical stokers attached to the boilers. Ashes fall from the grates into the bins mentioned above, and are then led by shoots down to the basement, and delivered into cars running on rails, which extend for the whole length of the building. In the construction of the chimney stacks brick has been discarded, except for lining the great steel tubes. The thickness of metal used varies from $\frac{3}{8}$ in. to $\frac{1}{4}$ in., and the lining is of firebrick for one-third of the height, the remainder being of red brick. Even with this light form of construction the weight of each chimney is about 500 tons. In the engine-house, provision is made for the reception of sixteen Westinghouse-Corliss engines of 8,000 indicated horse-power each, and it should be observed that these engines are probably the first of very large capacity to be equipped with poppet-valves, which are specially suitable for use with superheated steam. Each engine is to be direct-coupled with an electric generator, and the units will be disposed in two long rows down the engine-house. It is open to question whether the promoters of this undertaking have been wise in selecting reciprocating engines, as evidence shows that the most recent type of the steam turbine is more efficient and more economical than any other form of steam motor. Besides, it reduces vibration to a minimum, a point of much importance to the builder and structural engineer.

The Dolter Surface-contact Tramway.

IT seems as if the surface-contact systems of electric traction were at last going to be given a trial in this country. In this type of tramway we have no overhead wires, only studs slightly projecting above the level of the ground, placed at distances of every few yards between the rails. These studs are only "alive" when the car is over them, and the current is collected by sliding bars placed underneath the car. Some years ago we described the Kingsland system, in which the studs are made alive mechanically, and Swansea has recently adopted this method. The Lorain system, where the operation is effected by means of electro-magnets slung underneath the car has been successfully working at Wolverhampton for some months. The Dolter system, which the Torquay Tramway Committee have decided to adopt, is also a magnetic one. It has been working successfully for the last two years on a small scale in Paris, but it is being rapidly extended. As in the Lorain system, great use is made of the fact that manganese steel is almost non-magnetic, whilst it conducts electricity quite as well as ordinary steel. A strip of manganese steel through the centre of the stud separates the end portions magnetically. The two collecting skates are of iron, and are in contact with the north and south poles of six electro-magnets, and they rest on the two ends of the studs, which then attract a keeper in the contact-box underneath, which is in connexion with the high-pressure main. When the skate leaves the stud the keeper falls by its own weight and breaks contact, thus leaving the stud perfectly safe. In addition there is a safety skate at each end of the car, which short circuits the stud so as to make certain that it is disconnected before the car leaves it. It will be seen that overhead and conduit systems of electric traction are not going to be left in undisputed possession of the field, and we shall soon have data which will enable municipalities to calculate the cost of putting their trolley wires underground.

Shaft-Sinking.

ORDINARY methods of sinking shafts are not unaccompanied by disadvantages, and in cases where hard rock has to be encountered the process becomes both tedious and expensive. A new method has recently been tried at a colliery in Nottinghamshire for boring two shafts of 25 ft. 6 in. diameter, and, judging by the results obtained, it appears likely to come into general use. Operations are conducted by the aid of an appliance consisting essentially of a circular steel frame, having annular T-shaped slots entirely round its circumference. In these, clamps are carried, fitted with arms,

adjustable telescopically to the diameter of the shaft to be sunk, and each arm is provided with one or two drills driven by compressed air. The whole plant can be erected complete on the ground, so that it may be lowered bodily into the shaft and raised again on completion of the boring. The periphery of the circular frame is divided and indexed, so that any required number of holes can be drilled without the labour of marking out, which in the ordinary way is a somewhat serious item. Experience at the colliery mentioned shows that a circle of sixty holes 6 ft. deep can be drilled through hard limestone in two and a half hours, this time including lowering and raising the apparatus. A new form of platform has also been devised for use with the plant, to enable brickwork to be executed simultaneously with sinking operations. Compressed air is found to be the most suitable form of motive power for the drills, and incidentally its use ensures an ample supply of fresh air for the men working in the shaft.

Vulcanite Roofing.

THE British Fire Prevention Committee send us a Report of a comparative test of an ordinary slated roof and a flat roof covered with "Vulcanite" roofing and ceiling. The vulcanite roof was composed of 1¼-in. boarding on 7-in. by 2½-in. joists, plastered underneath; the boarding then laid with three thicknesses of asphalted felt, breaking joint, and cemented together with vulcanite, brought to a plastic state by being heated in a cauldron and applied to the asphalted felt with a brush. The edges were turned up against the angle fillet and covered with a No. 14 gauge zinc flashing. The results of the fire tests, as between the slated roof and the vulcanite roof, were very decisive:

"Slated Roof.	*Vulcanite Roof.*
In fifteen minutes the plaster to the ceiling began to fall.	In forty minutes the plastering began to fall.
In twenty minutes the interior of the roof was well alight.	In fifty-four minutes the underside of flat was a sheet of flame.
In forty-one minutes the slates began to fall.	In sixty minutes the fire had not passed through the flat, and it was sound enough to be walked upon."
In forty-seven minutes the whole of the roof collapsed.	

As Mr. Ellis Marsland, who directed this test, remarks,—"The result will relieve the minds of London District Surveyors and District Council Surveyors of any doubt as to a roof of this construction being as fire-resisting as an ordinary slated roof."

Wandsworth Technical Institute.

THE exhibition of the work done at this Institute shows much conscientious work on the part of the students, but unfortunately displays much less life on the part of those whose duty it is to provide the learner with the full measure of help. The brickwork, plumbing, and joinery departments are doing good work. They have the merit of bringing to the hand of the student these branches of his craft, which are difficult to reach except by such help, and if the school can turn out such work as is exhibited by Mr. C. A. Brown in the joinery and geometrical drawing sections, sufficient proof is given of honest effort by teacher and student alike. It is in the architectural section that such absolute failure exists; not so much in draughtsmanship as in the design of the examples from which the drawings are made. Surely our technical institutions have men in their management who appreciate the value of good design sufficiently to cleanse its schools of such rubbish. The same applies to the crafts exhibits, which are admirably executed pieces of design which no school ought to allow within its walls. Let us perfect our crafts by all means, but, at the same time, let us select our examples from our best, instead of searching the dust-heap of the jerry-builder. Illustrations of the work of our old masters are within the reach of every one, and the duty of masters is to bring these to the knowledge of their students. If more modern and, in many cases, more practical and everyday work be desired, let technical institutes approach our best designers on the subject, and there is little doubt that they will gladly give designs from which a really creditable school set could be compiled. The students of technical schools constitute a medium through which the public taste can be influenced for good or ill, and it is the duty of all who have the work at heart to see that that influence is properly directed.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE fifty-ninth annual Congress was opened on the 15th inst. by the President of the year, the Mayor of the City of Westminster, Lieut.-Col. Clifford Probyn, J.P., at the Caxton Hall, Westminster, at 2.30 p.m., when a large party assembled for the inaugural proceedings.

The company afterwards visited St. Margaret's Church, adjoining the Abbey, where they were welcomed by the Rector, the Rev. Canon Hensley Henson, who gave a most interesting description of the church, which he said was really of more historical than archæological interest. The original church was founded by Edward the Confessor, and next to the Abbey is the most ancient and celebrated church in Westminster. Stow says: "The parish church of St. Margaret, sometime within the Abbey, was by Edward the Confessor removed and built without for ease of the monks." Edward the Confessor's church remained until the time of Edward I, at which period, again to quote Stow, "the merchants of the Staple (*i.e.*, the Woolstaplers) and the Parishioners of Westminster built it all of new, the chancel excepted, which was lately before new built by the Abbot of Westr.," "and this church (he says) remaineth now a fair parish church though sometime in danger of down pulling." The present edifice dates mainly from the middle of the fifteenth century, and is far more imposing internally than would be expected from its exterior, which has been recased and otherwise altered in comparatively recent times.

St. Margaret's is known as the church of the House of Commons. The Canon related some of the historical events connected with the church, which are many. Amongst others, he mentioned that, on September 25, 1643, the Covenant was read from the pulpit, and all those present held up their hands in assent to it. Here, in Charles I.'s time, all the fast-day sermons were preached before Pym, Cromwell, Harrison, Praise-God-Barebones, and the rest of the then Parliament of England. Hugh Peters also preached here in order to cause the Parliament to bring the King to trial.

There are many monuments to the celebrated persons who have found a resting-place in this church and churchyard, but the object most worthy of notice is the famous east window of painted glass. Very curious is the history of this window, so far as it has yet been traced with exactitude. Said to have been painted at Dort, in Holland—Gouda is also mentioned, where it is said it took five years in execution—it was presented to Henry VII. in view of the betrothal of his son Arthur to Catherine of Arragon, and was intended by the King to be placed in his new chapel at Westminster Abbey. The King, however, died in 1509, and the window was not erected there, but, somehow, was obtained by the Abbot of Waltham, in Essex. Whether it ever was erected in that abbey-church is unknown. It has been stated that at the Dissolution it was taken to Abbot Fuller's private chapel in New Hall, at Boreham. As this mansion, however, never belonged to the Abbot, but to Henry VIII., Mr. Gould held that if the window went into any private chapel of the Abbot, it was more likely erected in his private chapel at Old Copt or Copped Hall, near Epping, and that when Henry VIII. obtained the old hall he removed the window to his much-favoured palace of Beaulieu or New Hall. All this, however, is but conjecture. All we really know is that the window found its way to that fine Tudor mansion, and there remained for about 200 years, till, in the year 1737, John Olmius, becoming possessor of the house, at once commenced to pull it down, including the chapel. The glass of the window he preserved in chests. The window was next sold by Olmius to John Conyers, of Copt Hall, who paid fifty guineas for it, but he, deciding to pull down old Copt Hall, never erected the window, and it was sold by his son in 1758 to the parishioners of St. Margaret at Westminster for 400 guineas, and so, after some 250 years of strange vicissitudes, this beautiful, painted glass at length came back to the immediate locality for which it was originally intended, and, most curiously of all, uninjured. The monuments in the church commemorate, amongst many others, Caxton, who lived in the Almonry upon a site now occupied by the entrance to the Westminster Palace Hotel, and had his printing press in the triforium gallery of the Abbey; Raleigh; Thomas May, the poet; Sir Wm. Waller, the Parliamentary General; Admiral Blake; Hollar, the celebrated engraver; and Blood, who attempted to steal the regalia. The poet Milton was here married to Katherine Woodcock who died in the following year. Only one brass remains; all the rest were sold in 1644 at 3d. and 4d. per lb., as is attested by the churchwardens' accounts. From the time of Stow this church has been periodically threatened with demolition. It is to be hoped, however, that wiser counsels will continue to prevail, and that this most interesting edifice may be allowed to remain. Its removal would be a distinct loss to the appearance of the Abbey by reason of the scale which it gives, for St. Margaret's is by no means a small or insignificant building, but is a good-sized parish church.

In the vestry the visitors were shown by Canon Henson the fine collection of silver plate, churchwardens' maces, &c., and the parish registers, the earliest of which is dated 1537. Many interesting old engravings are framed and hung on the walls, from one of which it appears that as late as the year 1726 a woman was burnt alive for killing her husband.

Leaving St. Margaret's Church, the party proceeded by train to Addison-road Station and walked to Addison-crescent to view the rare and valuable examples of ancient china, faience, and majolica ware, illustrating the history of the art of pottery and china, collected by Mr. R. Duppa-Lloyd. Some of these treasures are priceless in value. Mr. Lloyd also exhibited a few rare examples of bronze as specimens of art, or artisan work. Some examples from a very large collection of old engravings of the Italian school from 1420 to 1795. The German school, 1450 to 1800. The Dutch and French schools, from 1500 to 1800, and the English school from 1600, were also exhibited and admired. These engravings, from an archæological point of view, are very instructive. Having partaken of tea the visitors returned to the hotel, and at 8.30 proceeded to the Caxton Hall, where they were received by the Mayor and Mayoress of Westminster at a conversazione, and where his worship delivered his presidential address. This dealt generally with the history of Westminster and reminded us that it is more ancient than the City of London, and was an important trading centre in British days long before Londinium grew out of the marshes. The Abbey, the Roman remains found in the neighbourhood, the Parliament—itself a vast theme—the site of the Royal Palace of the Saxon and Danish kings: the Woolstaple, where now is Bridge-street, whose mercantile importance is still signified by the woolsack in the House of Lords; the Whitehall of Tudor and Stuart days, all were touched upon in a very interesting manner, bringing to the recollection of the hearers the fact that

the interests of the city of Westminster are to the antiquary, historian, and archæologist inexhaustible. In the course of his remarks the President stated that in the churchyard of Christ Church, Victoria-street, opposite the Caxton Hall, the notorious Colonel Blood was buried on August 26, 1680, and that, as related in the "Civil War Tracts of Lancashire," some 4,000 "Redshanks," or Scotch prisoners, were accommodated after being driven from Worcester field. Many of them succumbed to their rigorous treatment, and 1,200 of them were buried in Tothill Fields—now Vincent-square—and the churchwardens' accounts show that 30s. were paid for sixty-seven loads of soil laid on their graves, whilst 30*l.* was received from the Council of State for cleansing the church "after the Scottish prisoners had much annoyed and spoiled the same."

In a room adjoining the Mayor's parlour were exhibited some old records, the earliest extant being dated 1460, but the first was granted in 1256, giving a weekly market to the inhabitants of Westminster. These records were collected together and bound in 1730. The Corporation maces and the loving cups—one very handsome, of silver gilt, dated 1588, and known as the "Armada Cup," and the famous "Tobacco Box"—were also exhibited and described by Mr. Terry.

Tuesday, September 16.

The members of Congress and visitors travelled to Rochester, where, at the Castle, they were met by Mr. George Payne, F.S.A., who was the guide of the party throughout the day. Assembled in the keep the company listened to a lucid and able description of this celebrated castle given by Mr. Payne, who, by the aid of a large scale plan, indicated its position with reference to the walls of the Roman town. These Roman walls have now been accurately traced and plotted, and the positions of its four strongly fortified gates have been identified. The walls enclosed an area of about 24 acres, and the gates were situated at the four cardinal points. Many coins and the remains of piles were found at the time of the building of the present bridge over the Medway, showing that there was a bridge here in Roman days, and some of these piles are now preserved in the keep of the castle. A causeway had been discovered in the marshes on the north side of the river, and upon its masonry were still remaining the traces of wagon and chariot wheels. Mr. Payne conducted the party round the castle and described the explorations which had been carried out by the Corporation of Rochester under his superintendence. The Corporation is deserving of the highest commendation for the great interest and care it has manifested in the preservation of the archæological remains of its ancient town. No restoration work has been attempted, but only careful and systematic reparation of the walls, the removal of the ivy, which was doing great injury to them, and the grouting of the walls with cement, so that now they will last and are secure for centuries to come. From the Castle the party proceeded to the Cathedral. Here Mr. Payne pointed out the different parts of the early work, the discovery of the foundations of the Saxon church of Ethelbert; the position of the semi-circular apse, the walls of which are now marked in double lines upon the floor of the Cathedral; and the evidence of Saxon walling were all indicated. The Cathedral was rebuilt by Gundulph, whose work extended to the position of the present pulpit, and had a nave of nine bays and a choir of six bays. The more ornate work in the nave and transepts is that of Ernulph and John, between 1115 and 1130, who reconstructed the Cathedral. Eastward of the choir the work is more recent. The masonry of Gundulph is enclosed in the present masonry of the columns of the nave. This church was from the earliest period both parochial and conventual, and, in consequence, disputes between the monks and parishioners of St. Nicholas were of constant occurrence, so that, in 1423, the church dedicated to that saint closely adjacent, was built for their use. The present choir of the Cathedral was first used in 1220, the Norman walls being incorporated in the existing walls.

After luncheon at the famous Pickwickian hostelry, the Bull Hotel, the archæologists journeyed in carriages to Cobham Hall, where they were welcomed by Lord Darnley in the drawing-room of that celebrated mansion. Mr. Payne gave an account of the building and of its former inhabitants, from which it appears the Lords of Cobham had resided on the site of the present house for over 600 years. The present mansion is a very fine example of Elizabethan architecture and dates from 1554 to 1603. The date, 1584, remains upon one of the gateways, and the date 1594 is to be seen upon a leaden water shoot. In the large dining-room is a mantelpiece of the Elizabethan period. One of the curious features of this room is the sideboard and sink of black and white marble. The ornamental iron railing of the grand staircase is dated 1601-1603. In the picture gallery, Lord Darnley pointed out the most celebrated paintings, which include many fine examples of Titian, Rubens, Salvator Rosa, Vandyck, &c. Charles I. visited Cobham Hall with his Queen after their marriage at Canterbury, and the Hall was captured by the Parliamentarians in 1643. Leaving the Hall, the party drove to Cobham village and visited the church, where they were received by the Rector, the Rev. Mr. Berger, who described some of the architectural features of the building, and Mr. Payne pointed out the remains of a peculiar arrangement of a staircase, quite in the south-east angle of the chancel, a very unusual position, which is thought to have led to a passage and screen above and behind the reredos for the exhibition of relics. The chief archæological attraction of this church, however, is the magnificent series of monumental brasses of the fourteenth, fifteenth, and sixteenth centuries—some fourteen in all; they are in admirable preservation, and are probably unique. The original stone altar with the five crosses still exists. After seeing the church, the party visited the College, which was built by Lord Cobham in the time of Elizabeth. It has a fine old hall, and apartments for twenty pensioners. Some portions of the old chantry remain near the church. Thence the members drove to Sole-street Station for train to London.

Wednesday, September 17.

Leaving Waterloo Station at nine o'clock, the members of Congress and visitors went to Godalming, and at the station took carriages to Compton Church, where Mr. Ralph Nevill, F.S.A., met the party and described this very interesting church, which in some respects is probably unique in England. The architecture is late Norman, and the church retains the narrow lean-to aisles, with the little semi-circular windows at the western ends, which it is rare to meet with nowadays. The foundation of the church is probably of Saxon date, as it is mentioned in Domesday, and has a tower at the west end. The most interesting feature of the church, however, is its double sanctuary, which is considered to be unique in England. The lower sanctuary is groined, and the walls are in consequence much thicker than are those of the upper sanctuary, in order to counteract the thrust of the groining. The sacrarium arch of the lower sanctuary is very elaborately enriched with elegant overlapping cusped work of late Norman style, not often met with, and above this arch is the celebrated wooden screen protecting and fencing in the western end of the upper sanctuary. It is believed to be the oldest existing in England, and dates from about 1180. This Norman wooden screen consists of nine round-headed arches supported on octagonal pillars inserted into a solid sill-piece, the whole being surmounted with a cornice slightly moulded. There are also some fine specimens of carved woodwork in the altar rail and the western screen, both of the seventeenth century. From Compton the drive was resumed to Loseley Place, where the members were kindly received by Mr. More-Molyneux, the owner, and the tenant, Mr. S. Christopherson. In the great hall of this fine example of an Elizabethan mansion, Mr. Ralph Nevill, F.S.A., read a brief history of the house and its early occupants. Mr. Molyneux had laid out for inspection several of the historical MSS. for which Loseley is so famous, and these Dr. W. de Gray Birch, F.S.A., described and gave an account of. The manuscripts preserved at Loseley are amongst the most valuable in the kingdom, and are of the utmost political importance. They consist of a very large collection of papers of the latter half of the sixteenth century. Some of the most important bear the signatures at the top, as was the case in those days, of Henry VIII., Edward VI., Lady Jane Grey, signed "Jane the Queen," Mary I., the Princess Elizabeth, Anne of Cleves, James I., Sir George More, Lord Ferrers, Lord Herbert of Cherbury, &c. Others exhibited the signatures of the members of the Council of the Sovereign, Dudley, Earl of Leicester, Sir Christopher Hatton and others. There were some ancient charters also of the twelfth century. Mr. H. S. Malden, M.A., supplemented Dr. Birch's remarks by recounting his experiences of these manuscripts, of which he said there are thousands in the muniment room, in the course of his examination of them for the purposes of the Victoria County History of Surrey. Many of them, he said, throw much light upon local affairs all over the country, in the inventories and miscellaneous papers relating to the religious houses, and it would be quite possible to construct a history of the administration in London from the papers preserved in the muniment-room at Loseley. They dealt with all kinds of matters—pedlars' licences, the price of beer, the management of schools, the preparations against the Spanish Armada, the search for the Roman Catholic recusants, and many other things of greater or lesser importance. Mr. Molyneux pointed out the principal paintings and the numerous examples of ancient furniture in which the house is so rich. Loseley was on several occasions visited by Queen Elizabeth, who left mementoes of her visits in the shape of two small low-seated gilt chairs, with cushions said to be the work of her own hands, now on either side of the fireplace in the drawing room. Several of the elaborately carved fireplaces in this house are executed in chalk. Loseley cannot, of course, be classed with such palatial mansions as Longleat or Hatfield, but it is a good example of an English country gentleman's residence of the early days of Elizabeth. It was built by Sir William More between the years 1562-8. The detailed accounts of its construction are preserved, and it is curious to contrast the prices between that day and the present. The total cost, inclusive of materials, did not exceed 1,661*l.* 19*s.* 7*d.* Some of the materials were brought from the ruined buildings of Waverley Abbey. The painted panels in the great hall, with the monogram of Henry VIII. and Katherine Parr, came from Nonsuch House. From Loseley the drive was continued to Guildford, where, after luncheon at the Lion Hotel, St. Mary's Church was inspected, the company being received by the rector, Canon Grant. This church has many features of peculiar interest, which were pointed out by Mr. Ralph Nevill. The floor of the church slopes down very considerably from east to west. The earliest portion of the building is the tower, which has windows splayed inside and out and may possibly be Saxon, but this double splaying was usual in almost all cases where flint is used. The nave piers and capitals are all of the local chalk; some retain the original coloured decoration. The little delicate details of the carving could hardly have been executed in Bath stone. The plan of the church consists of nave, central tower, chancel, and aisles, the latter having apsidal chapels, which is an unusual feature, but the chancel is square-ended, in common with most English churches, that form being peculiar to this country and rarely found elsewhere. There is a good deal of painted decoration still remaining, although some of the paintings discovered by Mr. Nevill were obliterated by workmen in the absence of officials, a circumstance to be deplored, as they probably were the earliest decoration of their kind in England. Biblical subjects are the earliest in date. Legends were much later, and these destroyed paintings may have been of Saxon date. Master William, the Florentine, who was engaged in decorating the King's palace by Henry III., is thought to have executed the painting in the roof of the North Chapel, dedicated to St. John the Baptist.

Leaving St. Mary's, the only mediæval church now remaining in Guildford, the party wended their way to the Castle, paying a passing visit to the museum of the Surrey Archæological Society in Castle Arch. Beneath the walls of the ancient keep Mr. H. E. Malden gave a capital historical description of the Castle from the earliest times, which, he thought, might date from the days of Alfred the Great, when the mound on which the keep now stands was one of the burhs erected by Alfred, or his son Edward, as a defence against the Danes. Mr. Malden said the mound at Guildford seemed to belong to that class of construction in which the end, or two ends, of a ridge of hill were heightened by earth removed from the centre of the ridge. A spur of the chalk down over-

hanging the river was raised by earth removed from the ditch, still so well marked on the east side of the keep, and somewhat less so on the north and south. The mound was then encircled with wooden palisading, and had a house of wood upon the top, as is seen in the Bayeux Tapestry. Previous to the erection of the massive keep, Mr. Malden considered that stone walls encircling the mound took the place of the palisading and formed a "shell keep." These walls in parts still remain, and certainly were the walls of a building, and not merely of a courtyard. In one wall, that to the south, are the remains of several garderobes, with their shafts one above another, showing that the wall was of more than one story in height. Later on, when the massive keep was built, this enclosing wall would form the defence of an inner ward, which would have to be carried before the keep itself could be approached. With regard to the keep itself, it is placed on the side of the mound with one side standing on the natural formation, and this side is twice as thick as the others, and far less pierced by windows or passages, the reason being that it might hold up the whole structure, which it has done to the present time. The date of the shell keep may be of the time of the Conqueror, or one of his sons. The Castle is first mentioned in 1202 as a prison, and that, no doubt, was the present square keep, which for some centuries was used as the county gaol. The next place visited was the Guildhall, where the Mayor welcomed the party, and exhibited the Corporation plate, &c. Afterwards Abbot's Hospital, founded in 1619 by Archbishop Abbot for the residence and support of a master, twelve brethren, and eight sisters, was inspected. It is a charmingly picturesque group of buildings, forming a quadrangle, with the hall and chapel opposite the entrance tower. In a room close to the entrance the Duke of Monmouth was confined for some time while on his way to London after the battle of Sedgemoor. There is some very good painted glass in the windows of the chapel, of Flemish character. On the way to the railway station some of the members, led by Mr. Nevill, looked into an ancient house in the High-street of Charles I.'s time, which possesses a fine carved staircase and some quaint ironwork in window fastenings.

Thursday, September 18.

This day the members of Congress visited Colchester and devoted their attention entirely to the examination of the many remains of archæological interest in that very ancient town. Upon arrival the party at once drove to the Cups Hotel, where Dr. Laver, F.S.A., Mr. J. Horace Round, M.A., and other members of the Council of the Essex Archæological Society, met and welcomed them. Under the guidance of Dr. Laver they then proceeded, first, to the museum of the Essex Society, established in the Castle, and inspected the magnificent collection of Celtic antiquities, all found in Colchester or its immediate neighbourhood; also a good collection of Romano-British and other pottery, mostly found in the old British settlement at Lexden. Dr. Laver gave an interesting description of the finds which indicate survivals, and were not met with in the large Roman cemeteries, but in small private burial places. One vase was particularly interesting in this connection, as evidencing the survival of the method of construction of bronze vessels in the concentric flutings surrounding it. The celebrated "Joslin collection" is housed in the museum and forms the nucleus of the whole. A useful collection of modern antiquities is gradually being acquired—things gone out of date, memorials of obsolete customs, handicrafts, &c. Colchester in the days of Charles I. used to manufacture a particular kind of white cloth called "bays," which was introduced by refugees from Holland. This is now unknown and examples are hard to meet with. Dr. Laver paid 5*l.* for a piece only a few inches wide, and this now is framed and glazed and preserved in the museum. From the museum the party passed to the interior of the castle keep, where Dr. Laver gave some account of its history and construction. The keep is almost the largest in England, and is constructed of materials from Roman buildings with Roman mortar adhering to them, the walls at the basement being 31 ft. in thickness. The keep is the only part of the castle now remaining. It is a quadrangular structure, with square turrets at the corners. The castle stands in what was the Forum of the Roman town of Colonia Camulodunum, as has been ascertained from explorations made by Dr. Laver, during which he discovered a row of shops and traces of a piazza in the earthbanks. These were carefully plotted and notes made, and then were afterwards covered over with earth again to preserve them. Mr. J. Horace Round, M.A., pointed out the lines of the old Roman walls of the town, extending in the form of a parallelogram for nearly two miles. They are composed chiefly of stone from the eastern coast, with bands of Roman brick in regular courses; its thickness varies from 7 ft. to 8 ft., and at the gates and posterns is much thicker. The Balkan Gate exhibits a very good example of Roman rubble work. It is one of the three Roman gateways remaining in England. The remains of a guardroom on one side are very clear, and there are indications of another on the other side of the passage-way. After luncheon a visit was paid to the ruins of St. Botolph's Priory Church. Of the Priory there are no remains above ground. It was founded about the middle of the twelfth century. The ornamental western doorway is about fifty years later. These ruins are so well known that they need no description in these pages. They are now well cared for, having been skilfully treated for their preservation by the late E. P. Loftus Brock, F.S.A., about 1887. A small portion of the original tile pavement may be seen, *in situ*, below the present level of the earth in the nave, which is some 4 ft. above the outside ground level.

The Church of St. Giles was next visited. Here are interred the bodies of Sir Charles Lucas and Sir George Lisle, who so gallantly defended Colchester for the King, and who were so ungenerously, to say the least, shot by order of Fairfax, the Parliamentary General, after the surrender of the town in August, 1648. From St. Giles' the archæologists wended their way to St. John's Abbey gateway—the only remaining portion of the abbey. The abbey belonged to the Benedictine Order. It was a mitred abbey. All the buildings have disappeared but this gateway, which, apparently, dates from the last years of the fifteenth century. During the siege of Colchester in the seventeenth century an explosion occurred in this gateway, and the marks of the damage done may still be seen in the vaulting.

Friday, September 19.

To-day was, comparatively, an easy day, a visit being paid at 11 o'clock to the Abbey of Westminster, which Canon Hensley Henson had been able to arrange with the Office of Works, the present custodians of the sacred edifice, until the final removal of all the impedimenta connected with the recent Coronation solemnity. The Canon conducted the party, and gave an interesting description of the various features of interest. In the afternoon the members visited Staple Inn, Holborn, which, although not in Westminster, yet is connected with that City owing to the "Wool Staplers" having been connected therewith—and still having an identification in the "Woolsack." Here Mr. T. Cato Worsfold, F.R.Hist.Soc., met the party, and having pointed out the external features of the Inn, and indicated the residence of Dr. Johnson and other celebrated inhabitants in days gone by, led the company into the great hall, where he read a very interesting and exhaustive paper upon its history, the hall being kindly lent for the purpose by the Society of Actuaries, whose property it now is. In the course of his remarks Mr. Worsfold said that many of the houses in Holborn were built on arches in a foundation of sand. The district in earlier times was famous for strawberries, to which Shakespeare alludes. The "Stapler's" had a charge of 6*s.* 8*d.*, or half a mark, levied upon each packet of wool.

The painted glass in the bay window of the Hall, contains the insigna of the Staple—a woolpack. The Society of the Merchants of the Staple seems to have had its origin in the year 1248 (Henry III.), and was incorporated in the reign of Edward II., in the year 1319, under the name of the Mayor and Constables of the Staple of England, being established at that time in the ancient City of Westminster. Staple Inn did not long remain the principal place of business of the wool-staplers; they were removed to Westminster by Richard II., and in 1378 it became an Inn of Chancery.

The only evening meeting which it was possible to hold, owing to the lateness of the hours of return from the country excursions, was held this evening in the large room provided for the use of the Congress at the Westminster Palace Hotel. At 8.30, Dr. Birch, F.S.A., took the chair, and a very interesting paper was read by Dr. Brushfield, F.S.A., on "Britain's Burse or the New Exchange." This had references to Durham House and the present Adelphi, the "Burse" being established on the site of Coutts' Bank. The paper dealt at length upon the historical connections of the locality derived from careful research into original documents and letters. In the endorsement of a letter, dated June 1, 1711, the term of "Britannia's Burse" is used, and is the only example yet found where it is so called. Durham House was given in 1584, by Queen Elizabeth to Sir Walter Raleigh as his London residence, and there he lived for twenty years. Incidentally, Dr. Brushfield remarked that he thought it was a great discredit to Englishmen that there was no memorial in London, or Westminster, to that great man, and he suggested that at least the blazon of his coat of arms might be carved upon his gravestone in St. Margaret's Church.

The business of the Congress was brought to a conclusion, after the reading of the paper, with the usual votes of thanks to all who had assisted to make it the success it was generally admitted to have been, the proposed Saturday morning excursion to Harrow being abandoned, as so many of the country members desired to depart for their homes early in the day.

THE BODLEIAN LIBRARY, OXFORD: 1602-1902.

On October 8 and 9 the University of Oxford will celebrate the tercentenary of the Bodleian, which, then containing 2,000 books, was opened on November 8, 1602, in the building erected in 1487-8 over the Divinity School by Humphrey, Duke of Gloucester. Humphrey and Thomas Kemp, Bishop of London, had been mainly instrumental in the building—1445-80—of the Divinity School, restored, it is said, by Wren. The famous Library has its comparatively humble origin in the bequest by Bishop Cobham of Worcester of some books, for which was built in the later years of the fourteenth century a little room in an annexe to St. Mary's Church. Some hundred years afterwards the Duke Humphrey, who has justly been called the Mæcenas of his age and a pioneer of the Renaissance learning, made large benefactions to the University in the shape of the books and MSS. that were but too zealously destroyed as savouring of Popery by Edward VI.'s Commissioners, who were deputed in 1550 to carry out an edict "for the culling out of all superstitious books, as missals, legends, and such like." They further despoiled the Divinity School of all its stained glass, but fortunately spared the beautiful vaulting in Caen stone with fan tracery, and the curious drop pendentives commonly called "Wolsey's lanterns."

Sir Thomas Bodley was born at Exeter in 1545. His father, John Bodley, or Boadleigh, sought refuge on Mary's accession in Geneva, where his son attended lectures on Hebrew and Greek, with those of Beza and Calvin on divinity. After Mary's death the family returned to Devonshire, and in 1559 Thomas entered Magdalen College, Oxford; in 1563 he was elected Fellow of Merton. Taking political service under Elizabeth, he ultimately became her Minister to The Hague. Disappointed by Burghley of further advancement at home, he retired into private life, with the resolve, as he says, to set up his staff at the library door in Oxford, and to endeavour to reduce that place, then lying everywhere wasted and in ruin, to the public use of students. In 1598 he set about the accomplishment of his purpose—the re-establishment of a library which possessed so exiguous a remainder of the riches bestowed upon it by Roger Lisle, the Duke Humphrey, and other benefactors. In four years he collected and catalogued 2,000 volumes; he had Walter Raleigh and other friends for coadjutors in his scheme. Bodley induced the Stationers' Company to covenant on December 12, 1610, to send to Oxford a copy of every work printed by them. He defrayed the cost of adding a third story to the "schools," but did not live to see the fulfilment of his labours. He provided in his will for the endowment and maintenance of the library, which now has an income of about 9,000*l.* a year, though that revenue is all too little for its later requirements, and forms one

of the five that are entitled to receive all new publications under the Copyright Acts.

Thomas Huskenorton, Abbot of Osney, reduced the Public Schools into one building in 1439. The existing buildings of the Bodleian comprise the quadrangle of the (old) schools on the northern side of Radcliffe-square, and beyond, westwards, the H-shaped block, of which the lower portion of the cross-bar forms the Divinity School. The schools, designed, it is generally believed, by Thomas Holt, of York, who there introduced a method of counter-arching openings to resist vertical pressure, and built by J. Acroid, were erected in 1610-9. The court within measures 115 ft. by 105 ft. Some would ascribe the southern side, distinguished by its four orders, to James and Michael Bentley, who predeceased Holt (*obiit* 1624), but it seems that they were builders—in the modern sense of that word. On the east side stands the lofty gateway tower, the "Tower of the Five Orders," having on its inner front a storied line of the orders, with a statue of James I., enthroned, presenting copies of his own works to Fame and to Oxford, with emblems of Plenty, Justice, and Peace. In the upper two rooms are housed the University registers and muniments. Mr. T. G. Jackson, R.A., at the time (1876-82) of building the Examination Buildings, which have supplanted the old schools, examined the fabric of the tower, which he found was constructed of Roman cement, carefully modelled, the stonework having decayed. The decay proved to be so deep that a renewal of the whole was necessary. Above the doorways of the quad were inscribed the titles of the various schools and faculties. In renewing the stonework about twenty-five years ago the new label-bosses were left uncarved, albeit in the view of the quadrangle in Loggan's "Oxonia Illustrata," 1674, their predecessors were carved, it appears, as conventional heads. In the winter of 1900-1 the bosses were carved by Mr. E. E Hammond, under the direction of Messrs. Farmer & Brindley, and now present a set of portraits of eminent persons associated in past times with the studies followed in the "schools" which once occupied what is now the ground floor of the Library, or with the history of the Bodleian itself, the cost being defrayed by a grant of Convocation and by a resident Fellow of Oxford. The Hope Collection, in the Bodleian, furnished authority for most of the portraits.* A doorway in the western block, which has a panelled façade, opens into a high ambulatory or corridor, the Proscholium, more familiarly known as the "pig market," at the northern end of which is an archway that communicates with a smaller court enclosed by the Sheldonian Theatre; the ante-chamber of the Convocation House, 1639; and the H-shaped block that includes the Divinity School and the older portion of the Bodleian. The latter, renovated and improved by Mr. W. Jackson and Captain D. Galton, is now used as a reading-room. Beyond, westwards, are the Ashmolean and the gardens of Exeter College, by the remains of the old city wall; northwards, by the corner of Broad-street, is the Clarendon Building.

Archbishop Laud, John Selden, the Earl of Pembroke (Chancellor of the University, 1616-30), and Sir Kenelm Digby rank amongst earlier benefactors. To the contents of the Bodleian have been added during the last three centuries the statues given in 1755 by the Countess Dowager of Pomfret, the antique marbles presented by Selden's executors, and the Arundelian inscribed marbles gathered by Thomas Earl of Arundel, at his house in the Strand, London, which his grandson Thomas Duke of Norfolk, prompted by Evelyn, gave in 1667 to the University. They include also the Gough (topography and MSS., 1799), Ballard, Wood, Rawlinson, Malone, Douce, and Sutherland Collections. The auctarium on the chief staircase has been reserved for the choicest books and illuminated MSS. In the various apartments are many painted portraits. The Picture Gallery contains Fouquet's models of ancient buildings; Allan Ramsay's portrait, painted in 1749, of Flora Macdonald, "in character"; portraits of Mary Queen of Scots and Sir Kenelm Digby; some fine busts; and the statue executed in brass by Hubert Le Sœur, from designs by Rubens, of William Earl of Pembroke. The Hope Collection of 200,000 books and engraved portraits is deposited in an apartment known as the "Old School," which in 1890 was renovated and refloored, and fitted with new presses of iron and wood, under Mr. J. Osborne Smith's superintendence. So largely has the store increased that the printed volumes alone as bound amount to nearly 600,000, and there are upwards of 28,000 MSS. The "overflow" gradually assumes overwhelming proportions. As a remedy, the contents of the adjacent Radcliffe Library were transferred, forty years ago, to the University Museum, erected in 1855-60 in the Park at a cost of 80,000*l.*, after plans and designs by Sir Thomas N. Deane and Mr. B. Woodward. The modern books were then removed into the Radcliffe, now called the "Camera Bodleiana." On June 18 of last year the Drapers' Company formally conveyed to the University the new Radcliffe Library, built by that Company at a cost exceeding 21,000*l.* after Mr. T. G. Jackson's designs, and forming a wing of the new Museum buildings.

* On either side of each door: Old Marble School, Plato and Aristotle; School of Metaphysics, William Tyndale and the Lady Margaret, Countess of Richmond; Old Writing School, Cardinal Wolsey and Bishop Foxe; School of Grammar and History, Sir Thomas More and Dean Colet; Logic School, Camden and Selden; Law School, Linacre and Sir Henry Savile; Music School, Laud and Lord Clarendon; and Natural Philosophy School, Humphrey Duke of Gloucester and Sir Thomas Bodley.

THE HEALTH EXHIBITION, MANCHESTER.

THE last meeting of the nineteenth Congress of the Sanitary Institute was held recently at Manchester, but the Health Exhibition, which, as in former years, is one of the most popular features of the Congress, remains open until September 27. It is well worth a visit, although it does not contain any startling novelties. The exhibits are classified in four divisions—A, Science in Relation to Hygiene; B, Hygiene of Special Classes, Trades, and Professions; C, Construction and Sanitary Apparatus; and D, Personal and Domestic Hygiene. Division A is supposed to comprise ten sections, among which we may mention bacteriology, chemistry, demography, geology, and preventive medicine, but, as far as we can discover, there is only one exhibit in this division, and the owner of this is a "Consulting Oculist-optician." Division A is, therefore, as unconsciously humourous as the well-known chapter on snakes in Iceland. The second division is represented more fully, but here, again, there are sections without exhibits. Division D includes clothing, foods, soaps, disinfectants, and miscellaneous exhibits, many of which, although important in their way, do not fall within our scope. By far the greatest number of exhibits, to which we shall refer, fall within the three classes of the third division. Class I. includes building materials, construction, and machinery; Class II., water-supply and sewerage; and Class III., heating, lighting, and ventilating.

Messrs. Mellowes & Co., of Sheffield and London (Stalls 2 and 3), have been awarded a bronze medal for their well-known and widely-used patent glazing. It appears to be the only exhibit of its kind, but the award may be taken as a testimonial to the general excellence of the system. The steel sash-bars are entirely covered with "tin-lead metal" to prevent corrosion, and this is undoubtedly a valuable feature.

At Stall No. 6 Mr. E. R. Palmer, of Beckenham, shows a sewer-ventilating column, in which a fan, driven by a small jet of water, is placed to induce an upward current of air. The waste water from the column may be conveyed to a sewer-flushing tank, so that it serves a double purpose. The apparatus is simple, and gives promise of good results; it has gained for the inventor a bronze medal. Mr. Palmer also shows an automatic alternating apparatus for the distribution of sewage. This consists of a siphon chamber communicating with a distributing chamber, in which are two outlet valves. These valves are connected by a chain which passes over an overhead pulley. The rising and falling of a float in the siphon chamber are utilised to give to the pulley alternately a right and left motion, and thus alternately open and close each valve.

The Offa Ventilating Co., of London (Stall No. 7), show a simple air-inlet, which is well adapted for hospitals and also for domestic and other buildings. The external opening is an ordinary air-brick; the internal opening consists of a piece of coarse sponge-cloth held in position by a movable frame, and screened in front by a plain brass or iron plate, which can be pushed close to the wall to stop the opening, or drawn out to about 2 in. from it. The plate serves to deflect the air along the walls and thus reduce the risk of draughts in front of the opening. The ventilation is well adapted for the openings at the heads of beds in hospital. Repoussé copper plates are used where more decorative effects are desired.

Messrs. Fletcher Russell & Co., of Warrington (No. 12), exhibit, among other things, their "Rapid" water-heater or geyser for baths. It is fitted with safety taps of good design, and Bunsen burners. The water can be raised to a temperature of about 160 deg. Fahr. They also show the "Hurst" pipe joint for connecting lead and other soft-metal pipes, and also for connecting these to brass, gun-metal, and iron pipes. The joint is also used for connecting indiarubber tubing. For connecting lead to lead, the pipes are passed through two flanged ferrules, and the ends tafted back against the flanges; one of the ferrules has an outside thread, on to which an ordinary union nut is screwed, drawing the two flanges together and compressing the lead between them. The joint was tested by the judges, and gained a bronze medal for the exhibitors.

Mention may be made of the Crystalline Co.'s glass tiles (Stall No. 18) and "verre-sur-verre" leadless decorated tiles (obtained by superimposing glass of different kinds on glass) Some of the tiles have a dull surface with the ornament in relief; these are decidedly pleasing. Passing Stall No. 22, where a sewage purification plant of doubtful value is shown, we turn to the stand of the Exhibit and Trading Co., of Liverpool. It contains various sanitary fittings, some, if not all, of which are of American manufacture. Among them we noticed a porcelain bath of ordinary type and good quality, a large porcelain lavatory, and a siphonic closet. Messrs. Slack & Brownlow, of Gorton, receive a bronze medal for their "germ filters" exhibited at Stall 24, and Messrs. Wm. M. Glover & Sons, Ltd., of Warwick, a silver medal for their "Champion" dust van, and a bronze medal for their rotary watering van (Greaves's patent). This firm's "Bath" waggon for emptying cesspools, although mentioned in the catalogue, is not exhibited. One of its special features, we may say, is that the rotation of the wheels of the waggon in travelling to the cesspool exhausts the air from the tank. On arrival at the cesspool the latter is brought into communication with the tank by means of a coupling pipe, and, on a valve being opened, the sewage is forced by the normal external air-pressure into the tank. Where necessary, the air in the tank may be exhausted by means of a hand pump supplied with the apparatus.

The Killgerm Co., Ltd., of Cleckheaton (No. 29), show, among other things, some smoke-rockets and small drain-testing grenades, as well as urinal tablets and sulphur candles and cakes. At the next stall the Sanitas Co., Ltd., of London, exhibit Kingzett's drain-testers and sulphur-candles, "Sanitas," and other disinfectants, &c. Whitewashing is a sanitary operation enforced in factories and workshops, and the "Cyclo" whitewashing machine, exhibited by Messrs. John Line, Sons, & McDougall, at Stall 32, is, therefore, not out of place in a Health Exhibition. The machine is simple and portable, consisting of a barrel on wheels, with a hand-pump, hose-pipe, spraying-nozzle and iron extension rod. It is said that two men with this machine can do the work of twenty men with brushes.

Messrs. Burn Bros., of Charing Cross (Stall 36), exhibit different kinds of drain-plugs and bag stoppers, and a good assortment of cast-iron drain-pipes and fittings. For their improved bag stoppers they have been awarded a bronze medal. Among their other exhibits are the "Eclipse" smoke machine and the "Eclipse" double self-sealing manhole cover.

Perhaps the smallest show in the whole Exhibition is that at Stall 39 A, where Mr. W. H. Gibbs, of New Brompton, Kent, exhibits his spiral drain-scrapers, but the result is a bronze medal for the exhibitor. Messrs. W. Summerscales & Sons, Ltd., of Keighley, receive a silver medal for their laundry machinery (Stall 44), and Messrs. Matthews & Yates, of Swinton, Manchester, a bronze medal for their "Cyclone" fans. These fans have been used for drawing the shavings and sawdust from wood-working machinery and conveying them to the boiler-house; after passing through the fan, the shavings and sawdust enter a "cyclone" separator, which allows the air to escape at the top and discharges the solid matter at the bottom. At the works of Messrs

Henry Hadfield, Ltd., Leeds, shavings from 6 in. to about 30 in. long, and from 1 in. to 12 in. wide are collected in this way.

The Adamant and British Opal Wall Glazing Co., Ltd., Birmingham, have a well-designed stand (No. 51) in which their special manufactures are shown, including British opal glass tiling, fireproof flooring with concrete blocks on steel joists, partitions, &c. Models and drawings of the Horsfall refuse-destructor are exhibited at Stall 51A; two types are shown, the one with back feed and the other with top feed. They have gained a silver medal. Samples of the clinker are shown, screened to different sizes, and also specimens of bricks and flags made from the clinker mixed with lime or cement. At Stall 52 the London Tablet Co., of Sydenham, show their "Mezotil" covering for walls and ceilings, for which a bronze medal has been awarded; it consists of thin sheets of enamelled zinc, measuring 2 ft. by 3 ft., the enamel being of such a nature that it does not crack when bent at a right angle. The cheapness and imperviousness of Mezotil are points in its favour, but the poor quality of the designs is quite enough to prevent most architects from using the material.

Messrs. J. Oakes & Co., of Alfreton (Stall 55), have been awarded a bronze medal for their drain-pipes and fittings. These are of ordinary type, but well made. The most noticeable exhibit is a 2-in. glazed stoneware sink-waste in one piece, nearly 4 ft. long, containing two bends. The exhibit of the Sanitary Block and Tile Pavement Co., Ltd., of Westminster, and Briton Ferry, South Wales, has been selected for further consideration or practical trial. It is an artificial stone paving block made of crushed trap-rock, granite, or other hard material (passed through a screen with $\frac{3}{16}$-in. meshes), pulverised limestone, and refined Trinidad asphalt, mixed at a temperature of about 300 deg. Fahr., run into moulds, and subjected to a pressure of over 2 tons per square inch. Crushed clinker from refuse-destructors may be used instead of the granite or other rock.

A new drain-testing machine is shown by the inventor, Mr. Richard Ravenor, of Newbury (Berks), at Stall 57. It is a pneumatic apparatus, with a chamber for receiving a smoke rocket; a gauge is attached for registering the pressure up to 10 lbs. Any leak in the drain or soil pipe causes the pressure to fall, and the position of the leak can in many cases be located by the escape of the smoke. The apparatus can be packed into a box of convenient size, and is well adapted for testing old drains and soil-pipes. It has gained a bronze medal for its inventor. We also noticed at this stall some expanding drain-plugs, the metal parts being of aluminium; these are much lighter than corresponding plugs of brass or iron.

Passing mention may be made of the "Webb Patent Sewer-gas Extractor Lamp," which is now in successful operation in various towns, for the ventilation of sewers (Stall 58), and of Messrs. Worrall & Co.'s armoured fireproof door, with a fuse attached to a balance weight in such a manner that the door closes automatically in case of fire (Stall 60).

Messrs. James Stott & Co., of Oldham (Stall 64), exhibit their well-known gas governor, ventilating cowls and fans, and the "Stott" water-heater for heating water by steam for swimming-baths, &c.

Messrs. J. Defries & Sons, Ltd. (No. 67), exhibit different varieties of the well-known Pasteur (Chamberland) filters and of their "Equifex" disinfection appliances, for one of which—the "Improved Saturated Steam Disinfector"—they have been awarded a silver medal. They also show their Equifex Odourless Tank Wagon for emptying cesspools and gulleys. The air is extracted from the tank by means of pumps actuated by the wheels of the wagon or by hand, and is passed through a spray of disinfectant and through perforated baffle-plates moistened with disinfectant, before being discharged into the atmosphere. Messrs. Mather & Platt, Ltd., Manchester, exhibit a number of engineering specialities at Stall No. 68, among which may be mentioned a patent feed-water filter (Bronze Medal), Ridgeway's patent automatic sewage-distributing valves (Bronze Medal), and a patent water-softening apparatus, with a capacity of 300 gallons per hour (Silver Medal). Their patent Gravity Filter, 12 ft. high and 6 ft. in diameter, has been selected for further consideration or practical trial. Mention may also be made of their patent revolving spreader for distributing sewage over bacteria beds, the special feature of which is that the arms are open troughs instead of the usual perforated pipes.

Among the constructional exhibits is that of the Fireproof Plate Wall Co., Ltd., Manchester, manufacturers of the Bruckner patent wall-plates. These plates are composed of fire-resisting materials, 2½ in. or 4 in. thick, and are bonded together by means of tongues and grooves and cement grout. They have been extensively used, and have been awarded a bronze medal at this exhibition. The same firm shows specimens of "Eubeolith" patent flooring, which has the appearance of cork carpet, but is laid *in situ* without joints, and can be polished if desired.

Day's automatic waste-water closet is shown at Stall No. 70 in an improved form, the pedestal and tipper being removable. Mr. G. B. Wilson, of Barnsley (No. 73), exhibits an ingenious gulley-dredger, which can be converted into a shovel or ladle by pushing or pulling the handle at the top. Mr. H. B. Killon, of Manchester (No. 73A), shows a working-model of his "automatic distributing, holding-up, and discharging apparatus" for bacteria beds, which is so arranged that, while one bed is standing full another is being filled, the third being emptied, and the fourth being aërated; each bed in turn passes automatically through the four stages. At Stall 74 a full-size alternating gear for two sewage-filters is shown at work by the Septic Tank Syndicate, Ltd., of Exeter, together with other apparatus, samples of effluents, photographs, &c.

Various sanitary fittings are shown by Mr. W. E. Farrer, of Birmingham. A bronze medal has been awarded for his patent "bead-rim" lavatories, the special feature being an undercut bead around the rim of the basin; the purpose of this rim is to prevent splashing, but it can scarcely fail to become dirty. A bronze medal has also been awarded to Mr. Farrer for his adjustable cistern-bracket, the top bar of which is made to slide so that the projection can be varied according to the size of the cistern. A new kind of urinal-slab, known as the "Torjet," has been selected for further consideration or practical trial. It is made of compressed peat treated with chemicals, and brushed over occasionally with a deodorising solution, and is intended more particularly for places where the water supply is limited. Among the other exhibits are an automatic siphon flushing apparatus, the parts of which are easily removed and replaced.

Messrs. J. Duckett & Son, Ltd., of Burnley (No. 77), have an excellent show of sanitary ware, including wash-down water-closets, siphonic latrines, urinals, white-glazed manhole-bottoms in one piece, drain-pipes, school lavatories, &c. Bronze medals have been awarded for their isolated siphonic closets, and for their 20-gallon glazed-ware flushing tank fitted with a copper tipper. The tank is ingeniously contrived. The tipper contains a water-chamber and an air-chamber, and is hung on pivots near the top of the tank. When the tank is nearly full, the water flows into the tipper, and causes it to make a partial revolution, raising the back portion in which the air-chamber is placed, and to which a spindle, connected to the valve in the bottom of the tank, is attached. The water escapes from the tipper through a narrow slit of such a size that all the water in the tank is discharged before the tipper returns to its normal position and closes the valve.

A good general collection of sanitary fittings, drain-pipes, "Standard" access-pipes, bends, junctions, grease and other gullies, &c., is shown by Messrs. Wm. Harriman & Co., Ltd., of Newcastle-on-Tyne, at Stall No. 78. A bronze medal has been awarded to Messrs. C. W. Outram & Co., of Woodville, near Burton-on-Trent, for the "Hassall" water-closet suite (Stall No. 81). The basin is of the wash-down type, with a rather small water-area, and is so designed that the contents are cleared with a flush of 1½ gallons from a cistern fixed 3 ft. 9 in. above the seat. The makers do not recommend such a small flush. The closet appears to be well adapted for workmen's dwellings and other places where a strong and cheap apparatus is desired.

Messrs. C. Wills & Sons, of Bournemouth (No. 83), show a joint for connecting the outlets of water-closets to the branches of soil-pipes, vulcanite washers being used to protect the rubber ring which closes the joint. They also exhibit a galvanised cast-iron junction-arm fitted with anti-siphonage pipes. This consists of three pipes (in a single casting) arranged in a triangle—namely, a vertical pipe forming part of the soil-pipe, a branch pipe from the closet connected to the closet below the water level, and an anti-siphonage pipe. The number of joints is therefore reduced as much as possible.

The Candy, Caink, & Whittaker sprinklers for the distribution of sewage over bacteria beds are exhibited by the Patent Automatic Sewage Distributors, Ltd., of Westminster, at Stall No. 84. Messrs. Ewart & Son, Ltd., of Euston-road (Stall No. 86), exhibit a number of geysers of different kinds, including the "Califont," for which a bronze medal has been awarded. This is heated by gas, and supplies hot water under pressure to fittings above or below the geyser; it is so designed that the gas-flames are automatically turned up when any tap is opened, and turned down when the tap is closed. They also exhibit the "Euston" independent radiator, which is of the American type, filled with water, and heated by a single gas-jet.

Messrs. Shanks & Co., Ltd., of Glasgow (No. 87), receive a bronze medal for their No. 2,080 hospital lavatory, the taps and waste of which are actuated by levers conveniently placed for being moved by the surgeon's elbows. A silver medal has been gained by this firm for a well-made porcelain-enamelled cast-iron bath (No. 2,242), with non-concussive taps and quick accessible waste. Among the other fittings at this stall are lavatories and water-closets of different kinds, of which we may mention the "School Board" water-closet for children, which has the trap brought out sidewise and fitted with an inspection cap screwed into the crown.

Another good collection of sanitary fittings is shown at the next stall by Messrs. George Howson & Sons, Ltd., of Hanley, to whom three bronze medals have been awarded for high-back enamelled fireclay wash-tubs (30 in. by 29 in. by 15 in. deep inside), enamelled fireclay baths, and stall urinals with accessible channel in one piece with the body. We also noticed a good range of three school lavatories with extending brackets for supporting the waste-pipes, and the "Clifford" range of lavatories with high backs and floral or marble oval panels. A large enamelled fireclay sink is shown with a loose teak drainer over one half; under the sink, and forming part of it, are two L-shaped rails, on which the drainer can be placed when not required in the sink.

Mr. John Jones, of Chelsea (Stall 92), has received a silver medal for his well-known automatic, air-tight, double-seal manhole cover, which is now applied to cast-iron access-chambers. Bronze medals have been awarded for his patent air-inlets (for drains) with mica folding-doors, and for the "Carlyle" wash-down pedestal closet in vitrified stoneware with a 2½-in. seal. He also exhibits a good type of school closet, and various kinds of fittings for intercepting chambers, expanding drain-plugs with the metal parts of aluminium, air-bag drain-stoppers, &c. An ingenious little exhaust ventilating-fan for water-closets is worth mention; it is wound up by pulling a cord, and runs by clockwork for about eight minutes. Mr. Jones has also received a bronze medal for his patent joint for connecting water-closets to soil-pipe branches; the special feature is a split brass socket instead of the usual continuous socket; the new form, among other advantages, allows the joint to be released and the basin removed without difficulty. The Ames Crosta Sanitary Engineering Co., Ltd., of Nottingham (Stall No. 93), exhibit different kinds of drainpipes with special joints, made of Devonshire stoneware by Messrs. Hexter Humpherson & Co., of Newton Abbot, and an ingenious "Midland Stoneware" conduit for electric cables, made by Messrs. Hall & Boardman, of Swadlincote. For this and their cast-iron patent surface-water gully with double trap they have received bronze medals.

The International Purification Syndicate, of Westminster (Stall 94), exhibit specimens of polarite and ferozone, and drawings and photographs of sewage works and waterworks in which polarite filters are used. A bronze medal has been awarded to the Pendleton Sanitary Engineering Co., of Manchester (No. 95) for a new frame or cage for movable ash-bins, designed and patented by Dr. Quine; the original type of tipping bin is also exhibited. The "Loco" Drainage Apparatus Co., Ltd., of

Manchester, show a number of Wynde's patent fittings at the next stall, a bronze medal being awarded for the well-known rust pocket. At No. 98 Mr. Vernon Parker, agent, Westminster, has a successful variety show, including some excellent specimens of Duffy's "Immovable Acme" wood-block flooring, Hamblet's blue bricks and blue drain-pipes (bronze medal), the Howatson silica filter for fixing to a water tap (bronze medal), Hassall's patent safety joint for drain-pipes (silver medal), and the Shone system of ventilating drains and sewers.

At the next stall Messrs. Doulton & Co., Ltd., of Lambeth, have a large and varied collection of sanitary fittings of good quality, including baths, skeleton, shower, and spray, lavatories, water-closets, urinals, revolving mortuary table on ball bearings, bed-pan sinks, &c. Among the closets we noticed an improved valve closet with a trapped overflow, open at the top and flushed at the same time as the basin, and fitted with a regulating supply-valve and after-flush. A range of two "special spray lavatories" is also worthy of notice; the basins are in strong white-glazed fireclay, and the taps deliver the water in a fine spray and are self-closing and regulated to give a certain quantity of water after the press-knob is released. The Sanitary Appliances Syndicate, of Manchester (Stall 100), receive bronze medals for Baker's patent coin-receiving lock, and for "The Only" Non-Ball-Valve cylindrical store cistern for water; they also show automatic flush-tanks for water-closets, the tanks being empty until the seat or foot-lever is depressed. Messrs. Oates & Green, Ltd., Halifax, exhibit at No. 101 some good lavatories, urinals, and other sanitary fittings, and receive a bronze medal for a salt-glazed manger with patent "give and take" fastener. Porcelain-enamelled cast-iron baths, sinks, and other fittings of the usual types are shown by the Cannon Iron Foundries, Ltd., of Deepfields, near Bilston. The Eagle Range and Gas Stove Co., Ltd., of Birmingham, exhibit in addition to their well-known kitchen ranges, several varieties of their "Eagle" fire grate, with falling bars, and two pairs of sliding doors to regulate the draught. A silver medal has been awarded to the British Sanitary Co., of Glasgow, for their self-acting earth-closets. The Kitchen Bath Fitment Co., of Sheffield, exhibit two combinations of sinks and baths for small houses. In one the bath is of lead-coated sheet-steel mounted on small rollers and pivoted on the waste outlet, so that it can be turned under the sink when not in use; the sink is of artificial stone or glazed ware. In the other combination the bath is of cast iron and is a fixture, while the sink is of porcelain-enamelled iron attached to a wood drainer, which is hinged at the back, so that the sink and drainer can be turned up and fastened to the wall when the bath is required; water is heated by gas in a boiler fixed over the foot of the bath. The details are not altogether satisfactory, but there is no doubt that the combinations possess considerable merit, and will be very useful in cases where space and money are limited. The last exhibit to which we shall refer is a new patent revolving window, for which a bronze medal has been awarded to the inventor, Mr. G. A. Chaddock, of Liverpool. The window has a central upright bar, through which a vertical rod is passed; the rod has a thread at the top and a cog-wheel at the bottom, and by turning a handle (connected by gearing to the central rod) a top rail is raised into the head of the window frame; air is thus admitted at the top of the sash. By a further turn of the handle the sash is raised above the bottom rail, and can be revolved on the central rod and fixed in any position.

SANITARY HOUSE DECORATION.*

IN commencing the sanitary decoration of a house begin at the top, in the loft if there is one, and work downwards, cleaning and removing dirt from all recesses and hidden corners as you go. Such places are often overlooked and left as disease spots in a smart house. The loft especially receives the floating dust and impurities in the vitiated air arising from the lower parts of the house; therefore clean it out, remove all dirt, provide a skylight that can be opened, and brush down and whiten every part of the walls, floor, and under surface of roof, either with limewash or carbolic distemper. Do not leave the open joisting and rough plaster to accumulate more dirt, but put a thin flooring all over the loft and thus gain useful storage room, which being lighted and ventilated will make the whole house healthier. Where air and sunlight can enter microbes will be conspicuous by their absence. Sunlight is a great germ-killer, wherefore all dwelling rooms should have ample windows.

Descending to the sleeping apartments, and having perhaps admired the beauties of the smart new decorations, let us peel off that little piece of loose paper on the wall. To our horror we find that the "decorator" has forgotten to strip the walls before repapering them, and here are five or six layers of dirty old paper and decayed paste, in all probability holding vermin, or even the germs of disease behind the newest paper. Let it here be uncompromisingly stated that every scrap of old paper on walls or ceilings, and all old distemper, should be soaked, scraped, and washed off to the bare plaster, except perhaps in the case of a tightly hung varnished or painted paper, which already presents a solid impervious surface. Insist, as one of the first principles of sanitary decoration, on the stripping of walls and ceilings, and disregard all pleas or fears as to fetching down the loose plaster. If the plastering is so weak that it is held up by the paper or old whitewash, that is surely a pretty good indication that it needs repair. The desirability of enforcing the stripping of old wall paper and distemper, by the passing of a by-law to that effect, may be commended to the attention of Sanitary Authorities. Always use some disinfectant in the water employed in stripping and washing down the interior of a house, both as a sweetener of the rooms and as a protection for the workmen in case there may have been infectious illness on the premises. Safe and effective liquid disinfectants are so cheap nowadays that there is no reason for omitting this simple precaution. A solution of soda in warm water facilitates the removal of old paper and the effective cleansing of the surface. Wherever there is a sign of dampness trace and remedy it at its source, to protect health and to prevent damage to the decorations. In slight cases it may suffice to line the damp wall surface with lead foil or pitch-paper or to paint it before repapering, but all serious dampness should be thoroughly removed. Having stopped all cracks or imperfections in the plaster with Parian or Keene's cement, and rubbed down the plaster to an even surface, the walls and ceilings are ready for decorative treatment, which must, of course, depend on individual taste and the finances at command. In "clairecolling" or sizing walls or ceilings preparatory to papering, and also in the process of distempering, the smell of size is often very offensive, and this is not to be wondered at when its organic nature is considered. This odour can be almost entirely neutralised by the addition of a gill of turpentine to a pailful of melted size or distemper. This is actually an improvement to the body and binding properties of the material as well as a deodorant.

In hanging papers, embossed pulp, or canvas materials on painted or varnished surfaces, a clairecolle of size and soda should be used—half a pound of soda to a gallon of melted size—to give a "bite" to the material to be hung, and to prevent blistering. The clairecolle for unpainted surfaces should be melted size with a little whiting and turps as aforesaid, no water. Many of the sanitary, washable distempers or water paints—so justly approved and largely employed nowadays—contain a percentage of turpentine, boiled oil, or other vehicles, as well as an admixture of dry white lead, zinc white, or soluble glass, together with some disinfectant. Such truly sanitary pigments cannot be too highly commended, as they are cheap, produce artistic and durable effects, and possess better covering properties than oil paint. One hundredweight of such a distemper will cover 840 sq. yds., while the same quantity of oil paint will only do an average of 500 sq. yds.

Little need be said as to the composition or application of paint to walls or woodwork beyond urging the use of zinc white (oxide of zinc), or Charlton white, as being non-poisonous and therefore more sanitary than white lead (carbonate of lead), the poisonous nature of which is well known, although it may be safely used with proper precautions. If white lead paint is used it should be genuine old, ground, white lead, mixed with pure American turps and Baltic linseed oil, with the addition of litharge driers or terebene, according to the weather in which it is used; and such paint gives off little or no odour or volatile particles. Do not use cheap white lead, as it is often adulterated with barytes (sulphate of barium), and avoid "young" or new lead, as it is deficient in covering properties and damages colour in its oxidation. White paint is the most healthful of all paints, because, apart from its artistic effect, it shows dirt better than coloured paint, and thus indicates the necessity for cleaning. A glossy surface is more sanitary than a dull or "flatted" surface, as it affords less hold for dirt. In selecting papers or decorations for the walls of bedrooms, and, indeed, for all living rooms, avoid large, staring patterns, and aggressive contrasts of primary colour in masses. The less pattern there is the better. A simple background of agreeable tone is more restful and suitable to a bedroom than any assertive decorative treatment.

A room simply decorated with a pale cream (not blue-white) ceiling and cornice, cream enamelled woodwork, and papered, painted, or distempered walls in a tint of soft non-arsenical green, or blue, for a warm, sunny aspect, or in warmer tones of terra-cotta, pink, or yellow for cold, dark rooms, will be quieter and more soothing to the senses, and thus more conducive to repose than more gaudy treatments. In purchasing paperhangings take care to procure them from a firm of repute, who can furnish an authentic guarantee that no arsenical colours or other poisonous ingredients are employed in the process of manufacture. The fermentation of the paste used in hanging papers and relief materials is a danger which can be avoided by the addition of a lump of alum, the size of a filbert, to a pail of paste. This helps to thicken the paste, giving better and more adhesive body, as well as having a hardening and non-fermentive action. The addition of a small quantity of oil of cloves also assists in checking fermentation. Lastly we have to consider the floor, which should be sized and varnished all over, merely having a loose rug, thus providing a thoroughly sanitary surface which can be kept clean and germ-free without the use of the scrubbing brush. All open joints should be stopped to prevent dust dropping through into the space beneath. Permanganate of potash is an excellent dark stain for clean floor boards, and has the additional merit of its disinfecting qualities.

The same general principles apply also to the decorative treatment of the reception-rooms, staircase, &c., elaborated to whatever extent artistic inclinations or means may permit. Paperhangings, where used, should be, preferably, those with a hard, smooth, surface, such as the hot pressed silk fibres or oil printed papers, not flocks nor mica papers, which catch the dust, and whose particles become detached in course of time, thus failing to comply with sanitary requirements. Painted and panelled walls and ceilings, hand-painted decorations of flat ornament in monochrome, colour or stencilling, with the embellishment of gilding in mouldings, and other ornamental details; plaster or compo-mounted enrichments, hardwood pannelled wainscotting, parquet floors, and every kind of decorative treatment that does not afford absorbent surfaces or dust-collecting ridges, shelves, or scrolls may be freely employed in an entirely sanitary scheme of decoration. In bathrooms and closets, do not have wooden enclosures to baths, sinks, or water-closets, as such places frequently serve to harbour filth, and thus become a nuisance. Let every part of the sanitary fittings be open and above board, so that any leakage can be detected and every part accessible for daily cleansing. Corners behind water-closets, and corners of rooms generally, would be more hygienic if slightly rounded to prevent the collection of dirt. The walls of bathrooms, lavatories, and the domestic offices should be covered with varnished paper, paint, or, preferably, with ceramic or enamelled metal tiling, so as to be impervious and washable. The latter forms of wall covering are strongly to be advocated for larders, pantries, and store cupboards. The floors of bathrooms, water-closets, and lavatories, also larders, should be cemented or asphalted. Mosaic of marble or glass is a material more often employed for the flooring of halls, steps, and lavatories in this country than for mural decorations, due chiefly to questions of cost,

* Abstract of a paper by Mr. Louis Hanks, read before the Sanitary Institute Congress recently held at Manchester.

but it is a matter for regret that this sanitary, artistic, and durable material is not more largely used for decorative purposes.

In conclusion, a word may be given to the necessity for ample inlet and outlet ventilation for every room, to promote the health of the occupants and to preserve the decorative adornments. The least injurious form of artificial lighting in all respects is, of course, the incandescent electric lamp, and where gas is used, every burner should have outlet ventilation to carry off the fumes. Carefully search for cupboards under stairs, also cellars or vaults. See that all such places have cement floors. Limewash them twice a year, and do not let lumber and dirt accumulate. Abolish brick or wood dustbins, and have iron portable bins. Bear in mind that soap and water, fresh air, sunlight, and cleanliness in general are as much to do with health as elaborate drainage and the complications of modern plumbing, and there is the advantage, moreover, that such simple things are within the reach of all—the poor as well as the rich. This rough sketch of a few points in the sanitary decoration and management of houses, while necessarily superficial, will have served its purpose if it provides material for discussion.

Illustrations.

ASCOT PRIORY.

THE new wing shown has been built to provide accommodation for the sisters who nurse and attend to the sick people in the main building. About thirty cells are provided, with workrooms and recreation-rooms, and day-room, or office, for the superior.

The material is coursed rubble masonry with Bath-stone dressings, to match as far as practicable the rest of the building.

Mr. W. Watson, of Ascot, was the builder, and Mr. Leonard Stokes, of Westminster, the architect. The drawing from which our illustration is taken was hung in this year's Academy.

COMPETITION DESIGNS FOR MUNICIPAL BUILDINGS, CREWE.

WE give this week illustrations of the selected design for Crewe Municipal Buildings, by Mr. H. T. Hare, and also one of the three designs which received second premiums—that by Mr. A. E. Dixon, of Leeds.

The following is Mr. Hare's description of his intentions in the design :—

"These buildings are designed to occupy a street frontage with light available on the front and back only. The area of the site is somewhat confined for the accommodation required, and the plans had to be carefully and economically arranged to secure the requisite amount of light and air.

The front is proposed to be carried out in stone and red brick, and the roofs covered with tiles. The floors throughout are to be of fireproof construction, and the internal areas lined with white glazed bricks; the main staircase to be carried out in polished Hopton-wood stone, and the finishings in the Council Chamber and Mayor's suite of rooms to be in wainscot. The heating to be by low-pressure hot water, ventilating radiators being introduced when required. Extraction to be by a fan fixed in the turret to which all rooms are to be connected by flues, except in the case of the Council Chamber, which it is proposed to treat separately."

Mr. Dixon's design is sufficiently explained by the following extracts from the Report sent in with his drawings :—

"The principal entrance from Earle-street is centrally placed, giving uniformity and balance to the elevation. Immediate access is obtained to the rates offices and accountant's departments by placing them on each side of the entrance, approached from a spacious entrance hall. The principal staircase is central, and has top light in addition to windows.

The sanitary department and weights and measures department are placed adjoining the back entrance, and can be reached without passing through the front portion of the building if desired.

The council chamber, mayor's parlour, reception-room, public ante room, and cloak-room for the councillors are grouped together in the front block. The waiting-room would be used as a ladies cloak room with a water-closet attached.

The two committee-rooms and the Town clerk's offices and lavatory occupy the rest of the first floor.

The second floor contains the Borough Surveyor's department occupying the north side, staff lavatory and waiting-room in the centre, and the medical officer's rooms and school attendance officer's rooms, and committee-room for the latter, and one extra room, occupy the rest of the floor. The sun-print room is arranged over the waiting-room with circular stairs.

Upon the basement floor are the storerooms, heating-chamber, and general strongroom.

Elevations to be carried out in brick and terra-cotta. Roofs of green Westmoreland slates. Floors fireproof of steel and concrete, with wood block for the offices, tiles and mosaics for corridors, &c. Oak block for the council chamber floor and oak parquetry for the Lord Mayor's rooms. Principal rooms to have modelled plaster in ceilings.

The total cubical contents amount to 420,000 cubic ft., which at 8d. per cubic ft. amounts to 14,000l., at which sum the author of the design considers the building could be carried out."

COMPETITIONS.

SCHOOL, BARNSLEY.—A few months ago local architects were asked to send in competitive plans for a school to be erected on a site acquired in Pitt-street West, Barnsley. These were received, and acting on the advice of the architectural adviser to the Leeds School Board a decision was arrived at in committee as to which plan should be accepted. On the 16th inst. a special meeting of the Barnsley School Board was held for the purpose of confirming this decision. It was agreed that plan No. 4 should be the one accepted, that No. 7 should have the first premium of 25l.; No. 1, the second, of 15l.; and No. 5, the third, of 10l. No. 4 was Mr. Ernest Dyson, of Kingston-place; No. 7, Mr. Dixon; No. 1, Messrs. Crawshaw & Wilkinson; and No. 5, Messrs. Moxon & Sons.

BOARD SCHOOLS, BORELAND.—The design of Mr. D. Forbes Smith, under motto X, has been selected by the Kirkcaldy and Dysart Landward School Board for a new school at Boreland, in a competition limited to the architects of the district.

BOER WAR MEMORIAL, HASTINGS.—The design and estimate of Messrs. J. Whitehead & Sons, Ltd., of 74, Rochester-row, Westminster, for this memorial have been accepted.

LIVERPOOL CATHEDRAL.—The following is the text of the Report issued by the assessors on the designs submitted in the preliminary competition for the proposed cathedral for the diocese of Liverpool :—

"GENTLEMEN,—Of the great importance of ensuring a fine design for the proposed cathedral there can be no question. Truro alone in England has had a new cathedral, the first built for many generations. Truro is but a county town, while Liverpool is one of the largest and most important of our cities.

The new cathedral must be a stately, a dignified, and a beautiful building. It must be suitable for the services of the English Church, and be capable of holding large congregations. All this is obvious.

The Committee having determined on a competition, it is our duty to select the best designs submitted in this preliminary competion, and then to invite their authors to compete for the great work, in accordance with the regulations that may be laid down for their guidance.

What seems to be necessary is a design having a distinctive character of its own, and one not without originality. A design with a striking unity of effect and idea.

We were prepared to find more designs of a Renaissance or a Classical manner. We were surprised to find so few in those styles, and those, we feel bound to say, not commanding or remarkable. The main body of the best designs sent in are Gothic. This seemed to point to Gothic as the style from which we should find it practical to select. And, indeed, that manner is accepted by most as generally the suitable one, except under especial circumstances, for church building. In making a selection there seemed no doubt but that our own English phase of the style should be adhered to.

Many of the designs sent in have plans more or less like numerous fine mediæval cathedrals, with many chapels clustering round the eastern end of the choir. It is no doubt an arrangement of much beauty. One or two such chapels may be desirable, as being very useful in bringing comparatively small congregations together for early or evening services, but many such chapels would not seem to be appropriate for the uses of the English church. There should certainly be one or two such chapels, but we suppose not more would be needed. Modifications of many of the plans submitted would, therefore, seem to be necessary. How far what we have said on this point should be embodied in the instructions to be given for the final competition, we leave to the consideration of the Committee.

We feel that the object of the competition is to enable the Committee to find out the best man for the work. What he submits may be thoroughly examined and discussed, and, if it seems desirable, may be modified or improved on.

The opportunity, the great opportunity, must not be lost for the erection of a really stately and a beautiful building, one of striking proportions, and of delightful detail. Our old ecclesiastical buildings afford many such examples. Not, indeed, that they should be copied, for Liverpool Cathedral must be an original work of art and have a character of its own—one fitted for the requirements of the present age, and one specially designed for its site. The spirit of our best architecture may, however, well be caught, and its magnificent traditions may be recovered and handed on.

Whatever style is adopted there should be that nobility of expression and that refinement of feeling that is so characteristic of all the best architecture of the great times. We may add that a noble simplicity, enhanced by touches of beauty, is not a thing to be afraid of.

In judging the designs one must take care to discern the real effect that the building would have, and not be led away by any clever delineation of a conception that may not be really good. This is evident, but a first impression given by a clever and beautiful drawing, even though it be of a poor design, may be misleading and deceptive.

We shall look forward with interest and pleasure to the work of reporting to the Committee on the designs to be sent in for the selection of one that may be not unworthy of your important and great city of Liverpool.

There has happily been some revival of taste and knowledge of architecture in recent years, and this new cathedral should show a dawning sign of that improving state of feeling, and mark the period as one of greater advance towards the beauty and the dignity that characterised the great days of art; and, above all, it should be an example of cultured and religious feeling in church building.

With regard to the plans submitted we beg to report that we have examined the various portfolios of designs, and all the drawings that were hung on the walls, with great care and with the deepest interest. The number in all is 103, of these thirty-three are designs prepared expressly for this competition. They represent much labour, and we may also say a considerable amount of talent. Twenty-three are sent as evidence of skill and ability to design a cathedral, and consist mainly of designs which have been submitted mostly in competition for large churches in different parts of the world.

The remainder are a miscellaneous collection of photographs, drawings, and sketches, partly ecclesiastical and partly secular. Though many of them are of much excellence, they do not show any evidence that their authors have any special claim to be considered aspirants for the work of building a cathedral. It is vain to shut one's eyes to the fact that many of the competitors in this last class have taken absolutely no trouble. They have simply sent in a portfolio containing few, or many, photographs or drawings which they happened to have by them, whereas in the cases to which we first referred, where special designs have been prepared, the competitors have, many of them, taken great care and trouble, and have done their best to respond to the invitation of the committee.

From the plans sent in we have selected five that we consider show their designers to be capable men. They give evidence of considerable knowledge of old work, great care in design, and originality of a sound and practical nature. Not the originality which has little aim beyond being eccentric for the sake of being considered original, but which does not regard beauty and fitness as necessary.

These five, we suggest, should be asked to prepare complete designs for the cathedral, in accordance with the conditions to be laid down by the Committee.

This seems a small number to name out of such a long list of competitors, but on the other hand it may lead to greater effort being made to conceive, and delineate, a fine design, and with greater hope on the part of the designer for success, and, for the world, for an ultimate and satisfactory result. These designs are numbered Nos. 20, 45A, 68, 71, 95.

In addition to the above, we consider it would be a gracious act, and one that would be appreciated, to nominate a certain number for honourable mention as a distinct recognition of considerable skill shown, sometimes in planning, and sometimes in design, though we were unable to award them a still more honourable place. We selected eight names, namely, Nos. 17, 37, 41, 44, 45, 46, 84, and 94 for such honourable mention.

We are, Gentlemen, faithfully yours,

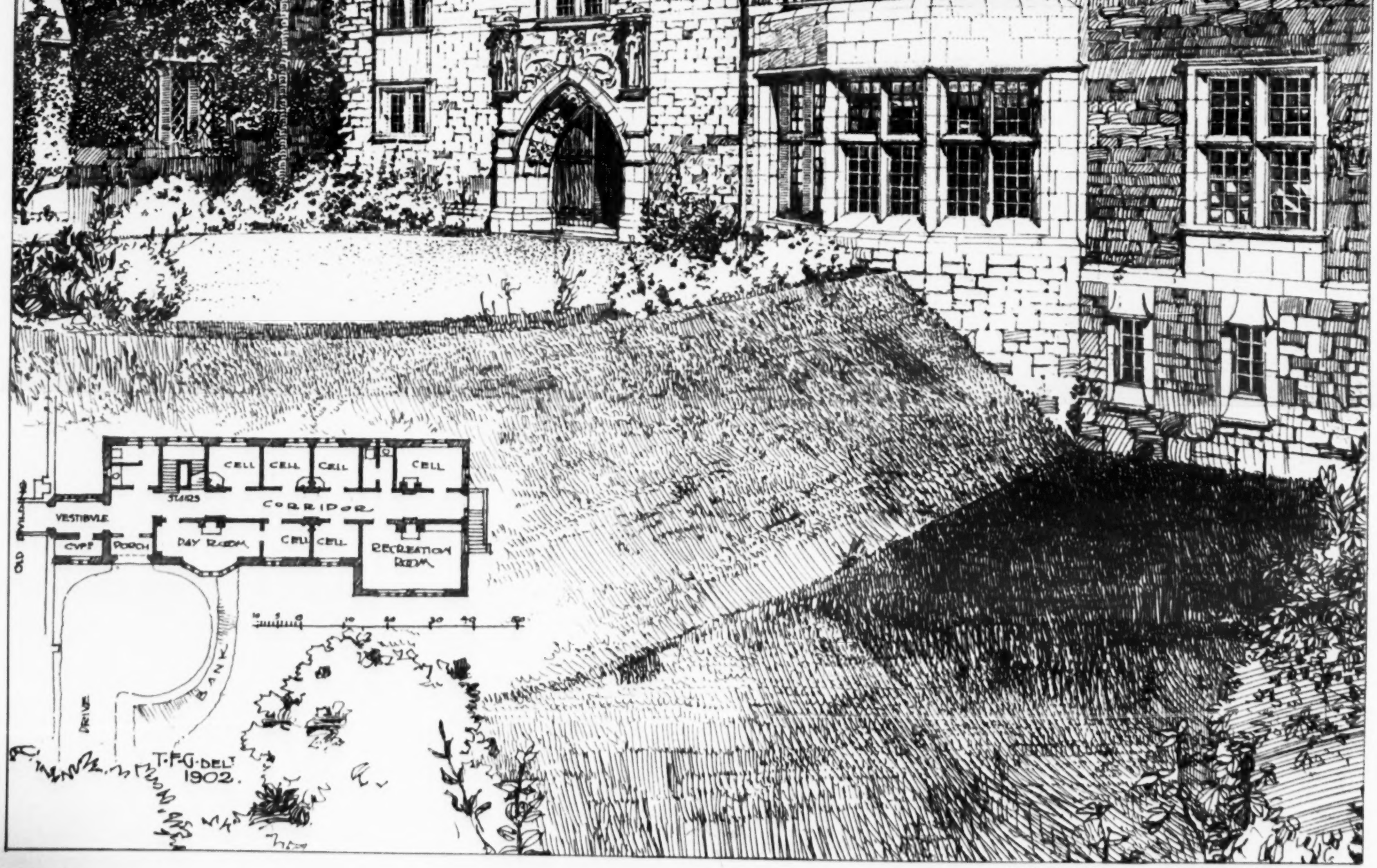
G. F. BODLEY, R.A.
R. NORMAN SHAW, R.A.

London, August, 1902."

The following are the names of the architects selected for the final competition and for honourable mention :—

Selected for Final Competition :

20 Messrs. Austin & Paley, Lancaster. 45A. C. A. Nicholson, 2, New-square, Lincoln's Inn.



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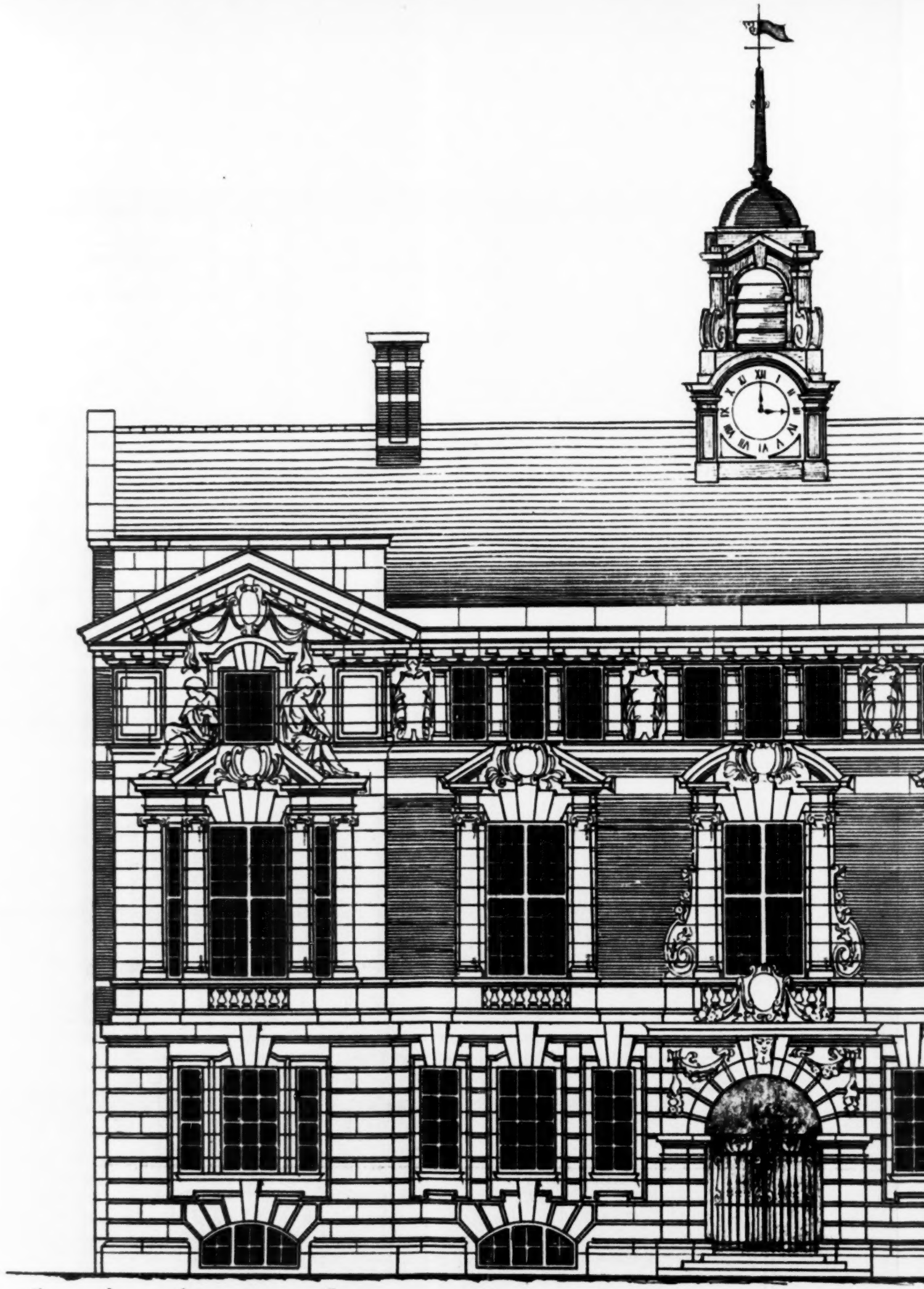
ASCOT PRIORY: NEW WING.—Mr. Leonard Stokes, F.R.I.B.A., Architect

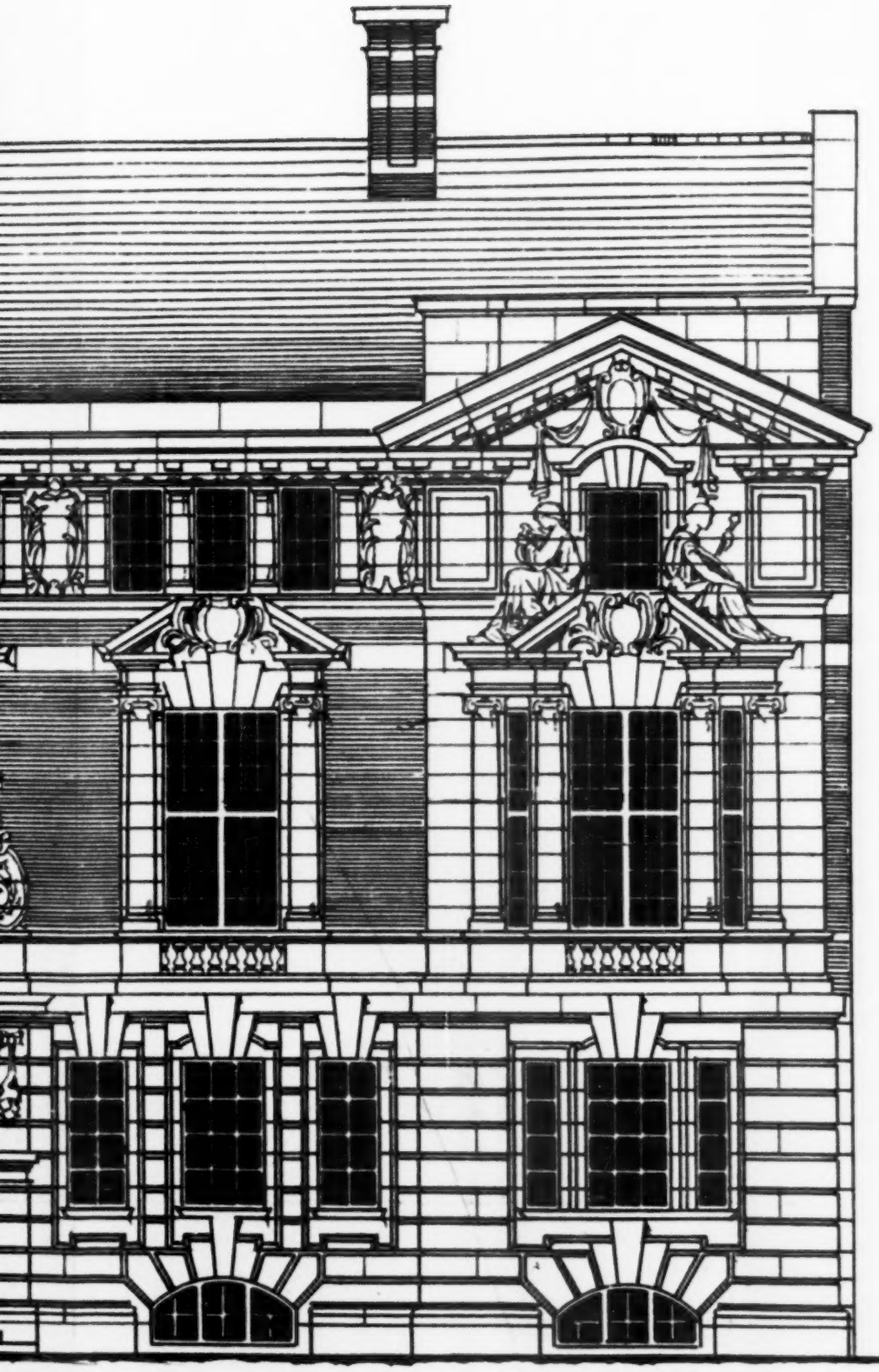
PLANS.



ELEVATION TO EARLE STREET.

CREWE MUNICIPAL BUILDINGS COMPETITION: FIRST PREMIATED DE

ELEVATION.



REET.

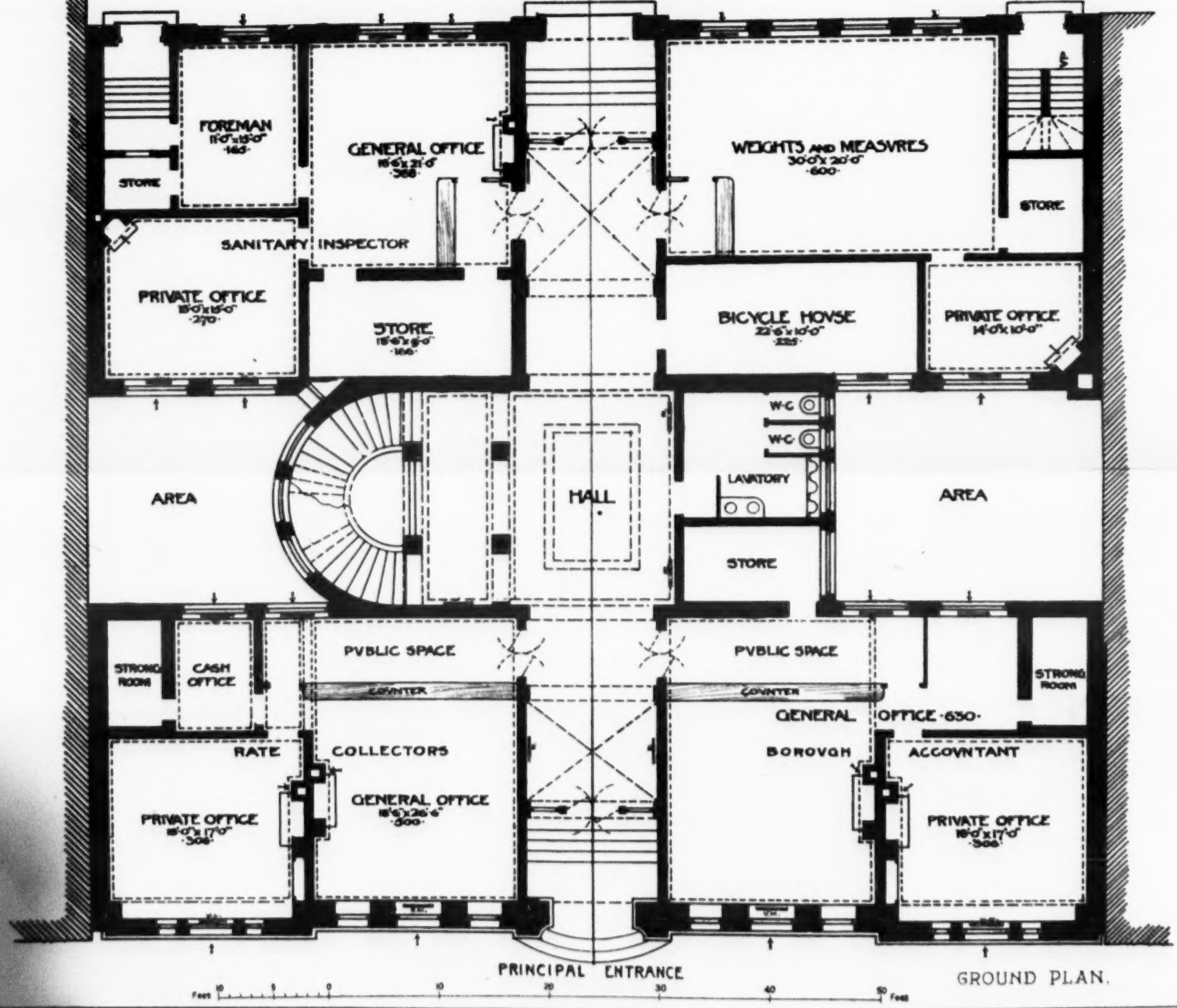
PHOTO-LITHO. SPRAGUE & Co.'s LTD. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

IIATED DESIGN.—By Mr. H. T. Hare, F.R.I.B.A.

CREWE MUNICIPAL BUILDINGS COMPETITION: FIRST PREMIATED DESIGN.—By Mr. H. T. Hare, F.R.I.B.A.

PLANS.

FIRST FLOOR PLAN.

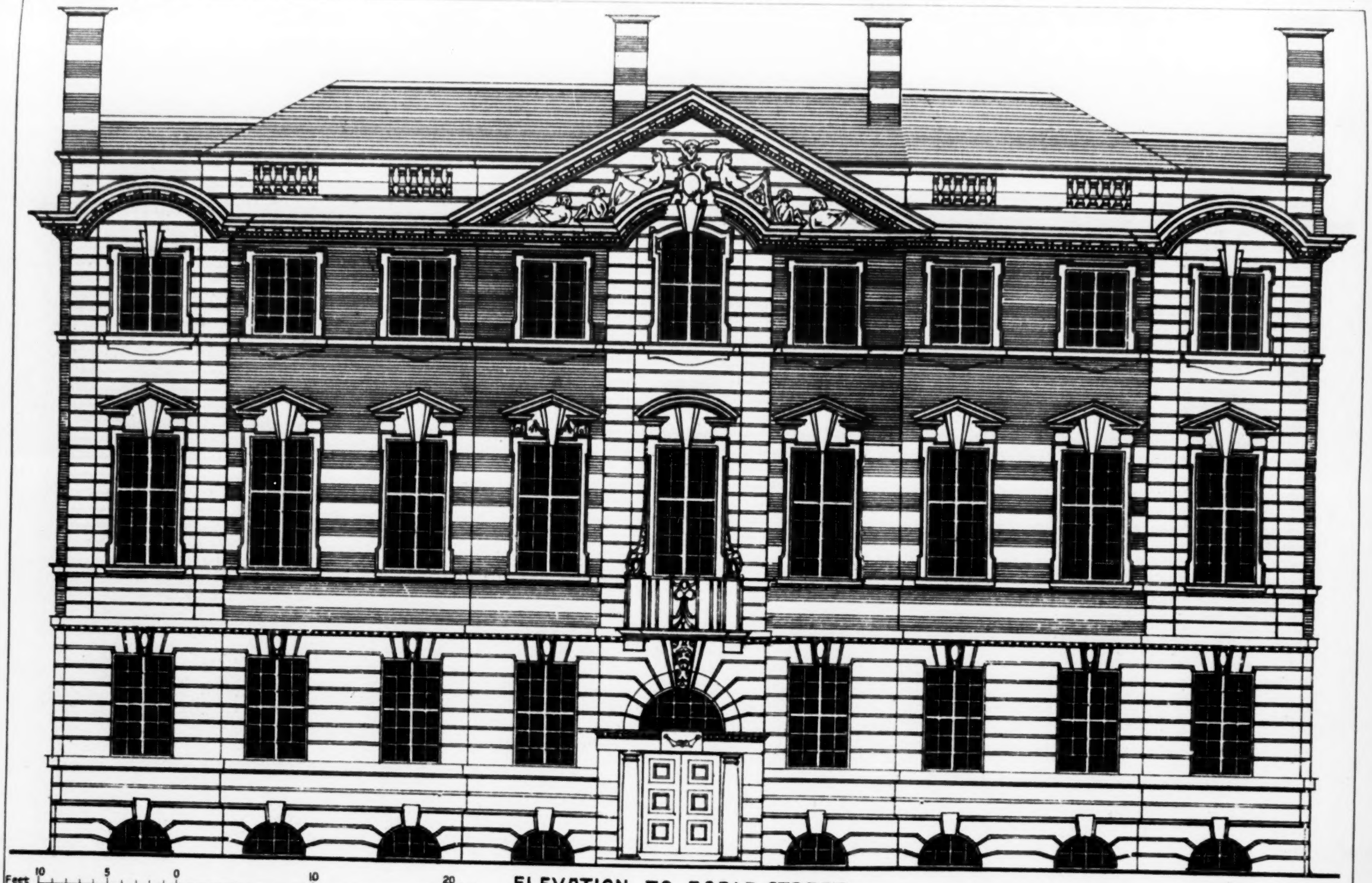


GROUND PLAN.

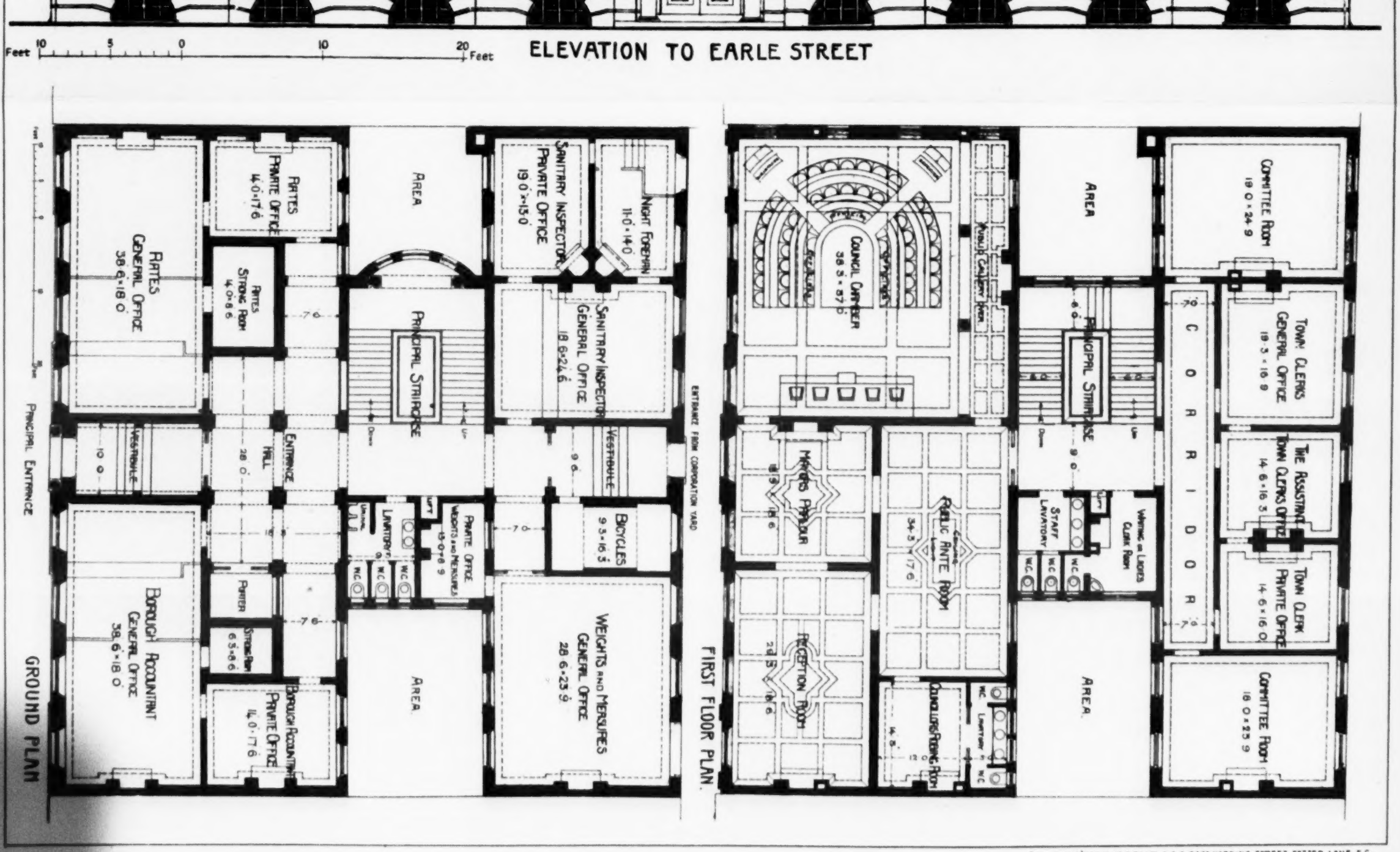
INK PHOTO SPRAGUE & Co LTD 4 & 5 EASY HARDING STREET FETTER LANE E.C.

CREWE MUNICIPAL BUILDINGS COMPETITION: FIRST PREMIATED DESIGN.—By Mr. H. T. Hare, F.R.I.B.A.

PLANS.



ELEVATION TO EARLE STREET



INK PHOTO SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

CREWE MUNICIPAL BUILDINGS COMPETITION: ONE OF THE SECOND PREMIATED DESIGNS—By Mr. A. E. Dixon, A.R.I.B.A.

ELEVATION AND PLANS.

London, W.C. 68. G. Gilbert Scott, 40, York-mansions, Battersea Park, London. 71. Malcolm Stark, 11, Little College-street, Westminster, London, S.W. 95. W. J. Tapper, 1, Raymond-buildings, Gray's Inn, London, W.C.

Honourably Mentioned:

17. Sir Thomas Drew, 23, Clare-street, Dublin. 37. J. Oldrid Scott, 2, Dean's-yard, London, S.W. 41. A. H. Skipworth, 5, Staple Inn, London. 44. H. C. Corlette, 2, New-square, Lincoln's Inn, London, W.C. 45. C. A. Nicholson, 2, New-square, Lincoln's Inn, London, W.C. 46. F. Walley, 1, City-walls, Grey Friars, Chester. 84. Jas. H. Cook, 12, St. George's-crescent, Liverpool. 94. Messrs. Reilly & Peach, Victoria Mansions, 28, Victoria-street, London, S.W.

BOOKS RECEIVED.

REPORT OF PROCEEDINGS OF INTERNATIONAL ENGINEERING CONGRESS, GLASGOW, 1901. Edited by J. D. Cormack. (Glasgow: W. Asher.)

THE ROYAL BOROUGH OF KINGSTON-ON-THAMES. By Dr. W. E. St. L. Finny. (Homeland Association.)

DESIGNING IRONWORK. Second Series; Part III. By Henry Adams, M.Inst.C.E. (Published by the Author.)

A TREATISE ON SURVEYING. Compiled by R. E. Middleton, M.Inst.C.E.; and Osbert Chadwick, M.Inst.C.E. (E. & F. N. Spon.)

Correspondence.

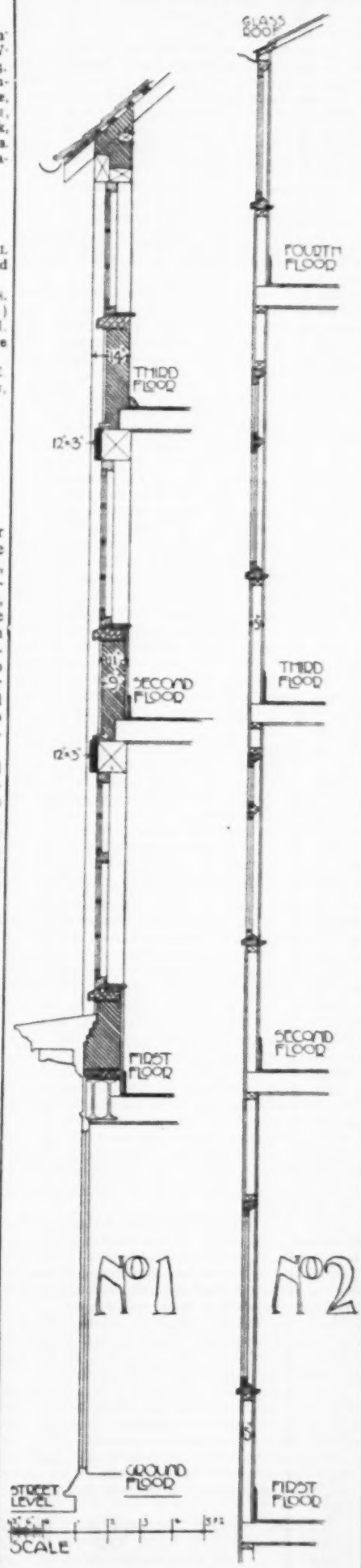
THE PUBLIC HEALTH ACTS.

SIR,—The paper upon "The Necessity for the Reconstruction and Consolidation of the Public Health Acts," read by Mr. W. H. Wells, Chief Sanitary Inspector of Newcastle-upon-Tyne, at the Sanitary Congress in Manchester, with the subsequent resolution adopted by the Conference, brings to the front a question which every one interested in building operations is doubtless already satisfied requires to be dealt with promptly; and Mr. Wells's paper will, I hope, create that general public demand for a reform which always seems necessary to induce the Local Government Board and Parliament to adopt it.

One of the chief difficulties in the rational application of the Public Health Acts as affecting buildings appears to be that the by-laws which have been drafted under those Acts, upon the lines of the Local Government Board's Model By-laws, are chiefly *positive* instead of *negative* by-laws. The effect of this principle of drafting them, coupled with the infrequency of their revision, is that new improvements in construction, which were not anticipated at the time of the promulgation of the by-laws, are either excluded from use, or else, from the obvious absurdity of any other course, the authorities ignore their own by-laws, so as to permit of such new methods of construction being adopted.

For instance, in many by-laws it is stipulated that walls are to be built of "good, hard, sound, and well-burnt bricks, stone, or other hard and incombustible material," and the thicknesses of the different walls are specified; consequently it is not permissible to build them of armoured concrete, for instance, though equally constructional, excepting upon the basis of the same thickness as is required for an ordinary brick wall. Or again, the covering of roofs is to be of "slates, tiles, metal, or other incombustible materials," under which by-law a concrete flat covered with "rock asphalt"—which is obviously stronger and more fireproof than a roof formed with wooden rafters and slates—is not allowable. Another example: The by-laws seem, to judge by results, to have the effect of reducing the air space at the fronts and backs of houses in our cities to the barest limit, yet the same laws are ludicrously applied, without modification, to houses built far away in the country; and I have known of a building owner being summoned for not providing, within some 2 ft. or 3 ft., the regulation depth of air space at the back of his house, though the adjacent land for miles around is agricultural land, and his own land, upon which the house is erected, comprises upwards of seven acres. Surely it should not be beyond the wit of an ordinary Parliamentary draughtsman to devise by-laws which would possess greater adaptability to altering circumstances, and stronger evidences of common sense.

Instances of a similar kind are innumerable, and they are not confined to the ordinary Local Government Board model type of by-laws, but also may be culled from those of cities whose by-laws or regulations have been sanctioned by virtue of special Acts of Parliament; and the diagrams accompanying this letter refer to



two of the most absurd results which have come under my notice of the "cast-iron" application of by-laws of the "positive" character, and of the need for those of a "negative" character respectively. They are taken from two recently erected buildings in Liverpool, which, though not quite so building-by-law-ridden a place as London, nevertheless possesses many Acts of Parliament to control building operations which are of a stupid and antiquated character; and this notwithstanding that their drafting has greatly devolved upon that very able Building Surveyor, Mr. W. Goldstraw.

In regard to diagram No. 1, the building, which is situate upon a main thoroughfare, covers about 58 sq. yds., is four stories high, the lower part a shop, the upper stories three small workrooms. In this case the building owner has been compelled to erect two pieces of wood, 16 ft. 9 in. by 12 in. by 3 in., in the positions shown by the section, for the following three reasons, viz.: (1) that the part occupied by the windows is held to be a "recess"; (2) that the pieces of wood are "important for the stability of the building"; and (3) that "it is vital in order to secure uniformity of practice in the administration of the by-laws."

That the pieces of wood serve no constructional purpose whatever, and that they are harmful as a means of collecting wet, is obvious; but the building owner has consented to erect them because it is cheaper to do so than to defend an action taken by a wealthy Corporation. The next owner affected by the by-law in question will probably elect to do the same, and so the by-law will remain unaltered, and the absurdities will be repeated.

In regard to diagram No. 2, the building is situate upon a main thoroughfare, covers about 700 sq. yds., is five stories high, the lower part shops and the upper stories offices. In this case the building owner has been allowed to have the joint use of the wooden staircase of an adjacent building (six stories high and covering an area of 1,300 sq. yds.) as his only means of access to the street from the upper stories, and the diagram shows the wooden passage 4 ft. 6 in. wide by 7 ft. 11 in. long, with external walls (*sic!*) only 5 in. thick, formed of wooden studding and matched boarding, which upon each floor affords the only means of access from this building to the before-named wooden staircase. The result in case of fire is obvious.

These two examples are typical, and though more could be given, they are sufficient to sharply illustrate the "straining at gnats and swallowing of camels" which results from the application of "positive" by-laws.

It is difficult to convince the ordinary lay mind of the urgent need for the revision of building by-laws even in the interests of sanitation, and it is still more so to convince it in the interests of architecture. Yet the title of Mr. Wells's paper must certainly appeal to architects, and encourage them to renewed effort towards the reform of building by-laws in the interests of architecture as well as of sanitation.

To give one example from Liverpool on this feature of the case. Under the by-laws it is not permissible to bring the frames of windows, if set in brickwork, within 4½ in. of the external face of the outside wall; yet there is in Liverpool, in a prominent thoroughfare, a new corner building which has no brick walls towards the two streets throughout two stories, and the outer wall (*sic*) or casing of which is entirely glass (comprising an area of some 3 600 sq. ft.), and is some 3 in. in advance of the face of the external wall; and this, be it noted, with the special approval of the authorities.

One could cite numberless instances of this kind of thing which have occurred under urban and rural building authorities in the country. Every architect has doubtless experienced the need for revision of the building by-laws. Mr. Lever, Mr. Cadbury, and other promoters of model towns have, I believe, expressed themselves strongly on the subject—and they must surely be free from the charge of wishing anything but sound building—and the time seems to have arrived when the question should be taken up and earnestly pressed to a successful issue by architects.

Liverpool. T. MYDDELTON SHALLCROSS.

CREWE MUNICIPAL BUILDINGS COMPETITION.

SIR,—In the *Builder* of the 20th inst. you criticise our design for the Crewe Municipal Buildings, and say that borrowed light is used in the public offices of rates and borough accountant. Such may have been the impression from a hurried glance at the

designs, but we may point out that direct light is provided to both the above-mentioned departments.

The lavatories were placed as shown because, in our opinion, they were required by the conditions.

BANISTER FLETCHER & SONS.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

13.—HARDENING AND TEMPERING STEEL—STEEL ALLOYS—THE CORROSION AND PROTECTION OF IRON AND STEEL.

STEEL which contains more than 0·5 per cent. of carbon becomes much harder and more brittle when suddenly chilled from a red-hot condition. The larger the proportion of carbon, the greater is the hardness of the rapidly-cooled steel. Steel cutting tools are shaped while the steel is in a condition suitable for forging, and are then hardened and tempered. The following table shows the approximate proportions of carbon commonly present in the hard steel used for different tools :—

Per cent. Carbon.			
1·3 to 1·5	in steel	used for	razors.
1·2 to 1·4	,,	,,	saw files.
1·1 to 1·2	,,	,,	drills and turning tools.
1 to 1·1	,,	,,	spindles and large tools.
0·9 to 1·0	,,	,,	cold chisels.
0·8 to 0·9	,,	,,	cold sets and shears.
0·7 to 0·8	,,	,,	dies.

Mild steel cannot be sensibly hardened by sudden chilling, but the proportions of carbon usually present in mild steel articles of various descriptions are as follows :—

Per cent. Carbon.			
0·3 to 0·5	in steel	used for	tyres, rails, cannon, &c.
0·2 to 0·3	,,	,,	boiler plates.
0·15 to 0·2	,,	,,	crank axles.

Hardening.—The steel in a red-hot condition is usually immersed in cold water or oil. As a general rule, the more rapid the cooling of the metal the greater is its ultimate hardness. Red-hot steel is cooled less rapidly when immersed in oil than when immersed in water, and oil is therefore employed when a high degree of hardness is not required. When an extremely high degree of hardness is required the heated steel may be immersed in mercury instead of into cold water, as the steel is thereby more rapidly cooled.

Tempering.—The article, after hardening in this manner, is, in most cases, too brittle for use, and is usually tempered. Tempering consists in reducing the hardness and brittleness by reheating the metal to a moderate temperature and then cooling it. If the temperature to which the metal is reheated does not approach that at which it becomes red hot it is immaterial whether the cooling be slow or rapid. If the metal were reheated to redness and then slowly cooled it would return to the condition in which it existed before hardening. The higher the temperature to which the steel is reheated the less will be the hardness of the tempered steel.

As the steel is heated for tempering it becomes covered with an iridescent film of oxide, the predominating colour of which varies with the temperature to which the steel is heated. The colour of the oxide film affords, therefore, a rough indication of the temperature of the steel, and as different articles require tempering to a different degree, the colour indication is used as a thermometric guide. Phillips gives the following as suitable tempering temperatures for different articles, and the corresponding colours of the oxide film :—

Temp. deg. Fahr.	Colour of Film.	Articles Tempered.
430 ..	Very faint yellow	.. Lancets.
450 ..	Pale straw	.. Razors and surgical instruments.
470 ..	Full yellow	.. Penknives.
490 ..	Brown	.. Scissors and cold chisels.
510 ..	Brown with purple spots	.. Axes, plane irons, pocket knives.
530 ..	Purple	.. Table knives, large shears.
550 ..	Bright blue	.. Swords, watch springs.
560 ..	Full blue	.. Fine saws, augers.
600 ..	Dark blue	.. Hand and pit saws.

The steel must, of course, be of suitable composition. Satisfactory razors, for example, could not be manufactured with steel containing only 0·6 per cent. of carbon, even though the greatest care were exercised in hardening and tempering.

Another method of estimating the temperature to which the steel is heated when tempering is to smear the metal with tallow, and observe the effects of the heat upon the fat; or a suitable alloy, which melts at the temperature to which the steel should be heated, may be manufactured, and the steel dipped into the alloy as soon as it assumes a molten condition.

Casting Mild Steel.—Owing to its high melting point, steel has to be cast at a very high temperature. The melting points of cast iron, steel, and wrought iron are :—

Cast iron.....	1,050 to 1,200 deg. C.
Steel.....	1,300 to 1,400 deg. C.
Wrought iron...	1,500 to 1,600 deg. C.

The milder the steel the most closely will its melting point approximate to that of wrought iron.

Instead of first converting the metal into pigs or ingots, and then re-melting it for casting, as in the case of iron, it is usual to run the steel direct from the furnace in which it is made into a ladle, and from thence into the moulds.

Blowholes.—The metal, while liquid, absorbs some of the air and carbon monoxide with which it comes in contact in the furnace, but as the metal cools the gases are to a large extent expelled. When the molten metal is withdrawn from the furnace the gases escape freely from the cooling but still perfectly fluid mass, but as the metal assumes a semi-solid or pasty condition it sometimes still contains gases which have failed to escape, and which are imprisoned in the metal even after it has completely solidified. These imprisoned gases form the cavities or "blowholes" sometimes found in otherwise excellent castings.

To prevent blowholes a very small quantity of aluminium is often added to the molten steel while it is in the ladle. The aluminium causes the molten steel to cease evolving bubbles of gas, and castings free from blowholes are obtained; but no satisfactory explanation has yet been given as to what becomes of the gases. It is believed that they remain in solution in the solid metal.

Other methods of preventing blowholes are :—(1) Agitating the molten steel while in the ladle; (2) retarding the rate of cooling; and (3) casting the metal under pressure.

Steel Alloys.—Of the innumerable alloys of steel which have been recommended from time to time the following are the most important :—

Manganese Steel is made by adding ferro-manganese to the molten steel contained in the ladles which receive the output from the steel-producing furnaces. The amount of manganese which may be alloyed with steel in this way may be as much as 20 per cent., but steel containing 14 per cent. appears to be the strongest and toughest. Manganese steel is especially suitable for castings, for the alloy becomes perfectly fluid and is less liable to contain blow-holes than ordinary steel. Manganese steel is difficult to work owing to its extreme hardness, and it is practically impossible to weld it.

Chrome Steel contains 2 per cent. or less of chromium, and is made by adding ferro-chrome to molten mild steel. Chrome steel is very hard, but is difficult to work or weld, and does not cast well.

Nickel Steel is made by adding metallic nickel to molten mild steel. When the nickel exceeds 1 per cent. it is almost impossible to weld it. The nickel increases the hardness and toughness of the steel, the hardness increasing until the nickel amounts to about 20 per cent.

Tungsten Steel is made by adding about 2 per cent. of tungsten to molten steel. Tungsten steel is extremely hard, and is used for the manufacture of drills and cutting tools.

Corrosion of Iron and Steel.—The corrosion of iron or steel is usually the result of the joint action of atmospheric moisture, oxygen, and carbon dioxide. Iron rust consists mainly of hydrated ferric oxide, but usually also contains small proportions of magnetic iron oxide (Fe, O_4) and traces of silica and carbonate of iron.

Cast-iron, wrought-iron, and steel are all subject to corrosion when exposed to the atmosphere. The comparative rates of corrosion of these different forms of iron are a matter of dispute. Mild steel was at one time generally believed to rust more rapidly than iron, but that notion is being abandoned, and steel is now used for both the boilers and the plates of ships. Nickel steel appears to resist corrosion much more effectively than ordinary steel.

Natural waters always contain dissolved carbon dioxide and oxygen, and, therefore, have a corrosive action upon iron and steel. Sea water is more strongly corrosive than fresh water, and the presence of sewage matter in water also accelerates corrosion.

When the iron, in addition to being exposed to moist air is also in contact with a metal which is electro-magnetic to it—such as tin, lead, or copper—an electrolytic action is set up, and corrosion is very rapid. Zinc is electro-positive to iron, and no electric action is produced, therefore, when zinc is allowed contact with moist iron.

Iron is readily attacked by most acids, and is therefore more rapidly corroded in the atmosphere of towns and tunnels than in the open country.

Preservation of Iron.—Iron may be protected from corrosion by covering it with a coat of some more durable material. The protecting coat may consist of (1) another metal, (2) an oxide film, (3) paint or varnish, or (4) enamel.

Tinned Iron.—Articles of tinned iron are made from sheets of wrought iron or thin Bessemer steel which have been tinned by being passed through a bath of molten tin. The tin forms an alloy with the iron, and adheres perfectly to the surface of the sheet metal. Tin is not oxidised by moist air, and so long as this metal alone is exposed to the atmosphere the iron beneath it will not rust. But in practice it is impossible to altogether avoid minute pin-holes in the tin coating, and the iron is sooner or later attacked when the tinned iron is exposed to damp air. As soon as spots of iron rust appear on the surface of the tinned iron, corrosion progresses rapidly.

Galvanised Iron.—Iron coated with metallic zinc is known in commerce as galvanised iron. Instead of making zinc-coated articles from sheets of the coated metal, as in the case of tinned articles, it is usual to first manufacture the articles in sheet iron and, after cleaning them, to dip them into molten zinc. In the case of corrugated iron, the sheets of iron are first "pickled" in hydrochloric acid to give the iron a clean surface, then dipped into zinc chloride, and are finally passed through molten zinc. Small articles are usually allowed to remain suspended in the molten zinc for a short time. Galvanising is sometimes effected by depositing zinc upon the surface of the iron by means of an electric current, *i.e.*, by an electro-plating process.

Oxidised Iron.—Iron may be protected by so treating the metal that a film of magnetic iron oxide is produced upon its surface. The oxide forms a smooth, thin, dead-black coat, completely covering the iron, and so long as the coat remains perfect it completely protects the iron from corrosion. If, after oxidation, the iron were hammered or rolled, it would no longer be protected from atmospheric action, for the film of oxide would be fractured in a number of places.

The film of magnetic iron oxide is produced upon the articles to be treated by heating them to dull redness in a muffle furnace into which a current of superheated steam is blown for one or two hours. The steam converts the surface of the iron into black magnetic oxide (Fe_3O_4).

Painted Iron.—Iron and steel structures are usually protected by painting them. The metal should first be carefully cleaned with steel wire brushes, then coated with boiled linseed oil, then given two coats of red lead, and finally painted with one or more coats of a paint of the desired colour, usually red oxide of iron. Bridges and other structures exposed to wind and rain should be repainted triennially. For iron pipes to be laid underground coal tar, free from water, forms a useful preservative paint. Domestic furniture and utensils of iron are often *japanned*, *i.e.*, coated with black varnish and heated in an oven at a moderate temperature.

Enamelled Iron.—Iron utensils are often enamelled. A fusible mixture of china clay with suitable fluxes is placed on the article to be enamelled, and the article is then fired in a muffle furnace at a high temperature. The process of enamelling iron is somewhat similar to that already described when referring to the manufacture of glazed bricks. Different firms have each their own particular method of enamelling.

Iron and Steel in Concrete.—Columns of iron

and steel are now commonly used as a core in brickwork and concrete, and the metal being *apparently* shut off from contact with the atmosphere is regarded as incorrodible. That corrosion of the metal is entirely prevented is improbable, and it is possible that many large modern buildings which owe their stability to concealed metal, will have become unsafe before a hundred years have elapsed, although it is true that under the most favourable conditions iron embedded in cement may be preserved in excellent condition for centuries.

Microscopical Examination of Iron and Steel.—When examined under the microscope, iron and steel are found to be composed of a number of different crystalline bodies irregularly mixed. During recent years, much attention has been devoted to the appearance of the different descriptions of iron under the microscope, and by observing the relative proportions of the different bodies present, it is possible to obtain a fairly accurate conception of the physical properties of the metal under examination.

GENERAL BUILDING NEWS.

CHURCH, ILFRACOMBE.—The Bishop of Exeter (Dr. Ryle), on the 15th inst., laid the foundation-stone of the new St. Peter's Church, Ilfracombe, which is being erected at a cost of 6,000*l.*, in Highfield-road, on the site formerly occupied by a temporary iron building. It will be a chapel of ease to the mother church of Holy Trinity. The new church will be built of pink limestone facings, with Bath stone dressings. The inside facings are to be of dressed ashlar from Hangman, Combemartin, the floors being of wood blocks, with tiled aisles. The heating chamber is to be fixed under the south-east corner floor, level with the vestries over, and a portion will be devoted to an organ chamber. There will be a tower in the north-east corner adjoining Highfield-road, and it will be furnished with a battlement turret, surmounted with a vane. Provision is to be made for a peal of bells. The roofs are to be open in construction and covered in red tile. The plan of the new church is: A broad nave 84 ft. by 24 ft., chancel 34 ft. 6 in. by 21 ft. 6 in., chapel 17 ft. by 10 ft. 3 in., two transepts 35 ft. by 15 ft. each, two aisles 48 ft. by 10 ft. each, giving seating accommodation for about 700 adults. A niche over the front entrance with a canopy will be occupied by a figure representing St. Peter. The chancel screens and seats will be of oak. Mr. G. H. Fellowes Prynne, of Westminster, is the architect, and the builder is Mr. Pickett.

CHURCH EXTENSION, HALIFAX.—The corner-stone of an enlargement of Halifax Church has just been laid. The enlargement will involve an expenditure of 2,500*l.* The scheme includes the addition of a Lady Chapel, which will accommodate seventy or eighty persons; two new vestries under it; and a north aisle, with new entrance. Mr. W. C. Williams is the architect.

CHURCH, LISNASKEA, IRELAND.—On the 15th inst., the foundation-stone of the new Church of the Holy Cross, Lisnaskea, near Enniskillen, was blessed. The church is being built in the Gothic style by Mr. James Wynne, Dundalk, under the supervision of Mr. Thomas F. M'Namara, architect, Dublin. Local stone is being used in its construction, and it will have cut stone dressings throughout. The side chapels will be separated from the chancels by clustered shafts of polished granite, which will carry the deeply-moulded chancel arch and side chapel arches. A feature of the structure will be the tower and spire, the height of which will be 150 ft.

WESLEYAN CHURCH, HELMSLEY, YORKS.—A new Wesleyan church has just been opened at Helmsley. The cost has been upwards of 2,000*l.*, and seating accommodation is provided for 330 worshippers. The architects were Messrs Hornsey & Monkman, York.

CHURCH, DALMUIR, DUMBARTON.—The memorial-stone of a new parish church, Dalmuir, has just been laid. The church will be seated for 750, but can be enlarged later when necessary by the construction of galleries. The architect is Mr. Geo. Paterson, Glasgow.

PRIMITIVE METHODIST CHURCH, LEEDS.—The foundation-stone of a new Primitive Methodist church and schools, to be erected at Harehills-avenue, Leeds, was laid recently by Sir James Kitson, Bart., M.P. The buildings have been designed by Mr. W. H. Dinsley, architect, Chorley, and will be in the Late Gothic style. The church, which will provide accommodation for 550 worshippers, will have a spire about 70 ft. in height. In the schools 300 scholars will be accommodated. Various classrooms, minister's vestry, and other rooms will be provided. The cost of the buildings (exclusive of the site) will amount to 5,360*l.* The contractor for the work is Mr. W. Lowley, Leeds.

CHURCH, IPSWICH.—The new district church of St. Thomas, which has been erected beside the Bramford road, was opened recently. The building is faced on the outside with corrugated iron, and the walls rest on a foundation of concrete and brick; the wooden framework is lined with non-odorous felt and polished pitch pine; the roof is carried to a considerable height; and the interior is lighted by five double lancet-headed windows on either side. For seating, chairs are provided, accommodation being thus found for about 250 persons. The designs were prepared by Mr. Raymond Wrinch, and the work has been carried out by Mr. W. H. Death.

CHAPEL, BARRY.—The memorial stones of the new chapel of Bethel English Baptist Church, Harbour-road, Barry, have just been laid. The new chapel, which is being built of stone with Bath stone dressing, will provide seating accommodation for about 700 worshippers. Underneath is a school-room which will hold 500. The new building will cost about 3,500*l.*, and is being erected by Mr. J. Prout, contractor, Barry Docks, from plans prepared by Messrs. Morgan & Sons, architects, Carmarthen.

BUSINESS PREMISES, SHEFFIELD.—New premises are being built for Messrs. Marples at the corner of High-street and Market-street, Sheffield. The building, which will contain six stories without the basement, will be 60 ft. high, and a couple of turrets at the corner will be carried 10 ft. higher. The material used for the first story is glazed Doulton ware, of pencilled blue and green in the lower parts, and buff terra-cotta above. The upper portion of the building will be of terra-cotta and red bricks. The buildings have been designed by, and are being erected under the supervision of, Mr. Walter Emden, of London, and Messrs. W. H. Lancashire & Son, of Sheffield, who are acting as joint architects. The general contractors for the work are Messrs. George Longden & Sons, Ltd., of Sheffield.

PARISH HALL, CROMER.—A new parish hall has been erected at Cromer, adjacent to the cottage hospital. The hall, which was designed by Mr. A. F. Scott, of Norwich and Cromer, is Gothic in style, and Messrs. Girling & Smith, of Cromer, were the builders. It consists of nave, two transepts, and apse, and has a total inside measurement of 102 ft. by 50 ft., or, exclusive of the apse, it is 74 ft. in length. It is constructed of red brick, with slated roof, and has clearstory windows carried on steel girders, supported by iron columns; and it provides seating capacity for about 800. There are two entrances, the main one facing the north into Church-street, and the other south, giving access from Lowden-lane, and on each side are 4-ft. concrete footways. At the south end of the building are vestry-rooms, on each side of the apse. The ceiling is a coved one, divided into six panels by moulded ribs. The flooring is wood block. The ventilation of the building is by Messrs. R. Boyle & Sons' system. Provision is made for the conversion of the transepts into a series of classrooms, by means of wooden sliding blind partitions. And these, again, it is intended to have made so as to admit of further subdivision, so as to give in each transept three classrooms of a capacity of about 24 ft. by 15 ft. Below the north window is a small gallery that will be of use for magic-lantern purposes.

WORKHOUSE HOSPITAL, SUNDERLAND.—The new hospital which has been erected at Sunderland workhouse at a cost of 40,000*l.* was opened on the 17th inst. The architects were Messrs. W. & T. R. Milburn. The hospital, which is built in a field of about six acres at the west side of the workhouse ground, consists of an administrative block, a pavilion for male inmates, a pavilion for female inmates, and a maternity hospital. The administrative block is in the centre of the site. On the ground floor of this block on either side of the doorway are sitting-rooms for the superintendent nurse and the resident medical officer. On the ground floor are separate waiting-rooms for female and male outdoor patients from other parts of the workhouse, as well as a consulting-room, a surgical room and dispensary for the doctor. The lady superintendent's office is at the back of the building, and in this room is a clock which, by being electrically connected with all the wards, records the visits paid to patients by nurses, when such record is desired. A combined weight and measure apparatus stands in the same room, and the telephone is also fitted, with communication round the buildings. The first floor contains dining and sitting-rooms for the nurses. Storerooms for linen, and a kitchen for the block are also on this floor. A story higher are the nurses' bedrooms; and the attics are for the use of the domestic staff. The various floors are reached by stone stairs, while at every landing is a corridor running at one end to a balcony, from which iron steps lead to the ground, affording a means of escape in case of fire. A covered-in corridor runs along the back of the administrative block, leading north to the male pavilion and south to the female pavilion. The two pavilions are planned exactly alike. They are two stories in height, and will each accommodate about 100 patients. On each floor there are large and small wards, as well as separation rooms. The duty-room contains a small kitchen range for the purpose of heating water, &c. A day-room is also provided wherein convalescent patients may sit, to read or play games. The buildings are heated by fireplaces in the smaller rooms, Shorland's ventilation stoves in the wards, as well as by hot-water. From any part of the ward patients can call the charge-nurse by means of electric bells. The maternity hospital stands by itself to the south of the ground in front of the administrative building. It contains ward-rooms, two separation-rooms, ward kitchen, and store-rooms. The whole of the buildings are fire-proof throughout, and hydrants and hose-pipes are placed in positions inside the walls, while an underground tank has been constructed close by for the use of the Corporation fire-engines, should they be required. On the outside of every building are placed iron fire-escape staircases, with easy access to each floor. All the pipes for water, heating, &c., are carried in large subways beneath the floors. In every case the sanitary fittings are built outside of the main buildings in sanitary towers and attached to the hospitals, with cross-ventilated, detached lobbies. The walls are all lined with glazed brick. All the floors are of pitch pine, polished, and all internal walls are finished with Parian cement. There are no corners about any of the buildings, all the angles being rounded off. For the heating of the building radiators are placed in special recesses beneath the window openings, and each is provided with and connected up to a fresh-air conduit, the quantity of air admitted being controlled by a shutter arrangement. The whole of the buildings are lighted with electricity from the Corporation mains. The contractors were Messrs. D. and J. Ranken. Messrs. R. T. Vaux & Sons are responsible for the heating arrangements, and Messrs. Reed, Ferens, & Co. for the electric lighting. The work has been carried out under the superintendence of Mr. A. J. Wilkins, clerk of works.

GRAMMAR SCHOOL, ASHBY-DE-LA-ZOUCH.—New buildings, erected at a cost of over 10,000*l.*, for the Ashby-de-la-Zouch Girls' Grammar School were opened on the 16th inst. The site is situated between the Nottingham and Leicester roads. The school has been designed to accommodate 180 pupils, and is in conjunction with the head mistress's house, which provides accommodation for the school staff, and thirty-eight boarders. The school contains assembly hall, 56 ft. by 28 ft., four classrooms, artrooms, physics laboratory, lecture theatre, cookery-room, chemical laboratory, with balance-room adjoining, five music-rooms, which are separated from the main school by a corridor, the walls of which, together with those around the rooms, are built hollow, and filled in with silicate cotton; a layer of this material is also placed above the ceilings to deaden the sound, and, as an additional precaution, double doors have been arranged throughout this department. Two separate cloak-rooms for day girls and boarders are provided off the main corridor. The house contains, upon the ground floor, entrance hall, dining and drawing rooms, dining hall, 29 ft. by 22 ft., separated by a servery from the kitchen, below which is the provision cellar, and beyond a scullery, larder, tradesmen's entrance, servants' staircase, and domestic offices. On the first floor there are six bedrooms, sewing-room, boxroom, assistant mistresses' sitting-room, a rest room, with bathroom and lavatory adjoining. On the second floor are situated four large dormitories, divided into cubicles, for the accommodation of thirty-eight boarders and two mistresses, together with bathrooms and lavatories, also bedrooms for servants, entirely separate from the dormitories, and having an independent staircase to the ground floor. The stairways are constructed in stone, and a separate emergency iron staircase from the dormitories is also provided. Externally, the building is of a Renaissance character, the front elevation having a tower and two gables, with a Mansard roof between, surmounted by a large ventilating turret. The buildings are of bricks, with stone dressings. The roofs are covered with Staffordshire tiles. Internally, the walls of the main entrance, boarders' hall, cloak-rooms, and lavatories are lined with a cream tiled dado. The assembly hall has a pitch pine dado. The whole of the school floors on the ground floor are of maple boards. The heating is by low pressure hot water, and a special scheme for fresh air inlet and exhaust ventilation has been provided for each room. The general contract has been entrusted to Messrs. W. Moss & Sons, Ltd., Loughborough, and Mr. W. G. Brown, Leicester, as joint contractors, and the whole of the works have been carried out from the designs and under the supervision of Messrs. Barrowcliff & Allcock, architects, Loughborough, Mr. G. T. North, acting as clerk of the works.

VICTORIA HALL, WIGAN.—The new Victoria Hall in Wallgate, Wigan, was opened recently. The hall has been erected in memory of her late Majesty, Queen Victoria, and outside of the building over the entrance is her bust. The edifice will be the headquarters of the Wigan and District Gospel Mission, and has a seating capacity for about 500 persons. The architects are Messrs. J. B. and W. Thornley, of Wigan, and the builders, Messrs. J. Wilson & Co., of the same town.

OFFICES AND WAREHOUSES, PERTH.—New offices and warehouses have been erected for Messrs. Arthur Bell & Sons, spirit and wine merchants, in Victoria-street, Perth. The new buildings consist of public offices, with waiting-room, private office, sample-room, &c. Behind are warehouses three stories high, with cellars underneath. The main warehouse is 70 ft. by 30 ft. The front is of Dumfries red stone. The buildings were designed and are being erected under the superintendence of Mr. David Smart, architect. The contractors are:

Mason and brick work, William Tait, Errol; joiner-work, Stewart & M'Farlane, Perth; slater, James Buchan & Son, Perth; plumber, James MacLeish, Perth; plasterer, Alexander M'Ritchie, Dundee; and iron-work, George Crystal, Perth.

BUSINESS PREMISES, HULL.—Two new shops in King Edward-street, Hull, are to be built by Councillor Costello and Mr. J. W. Powell. The architects are Messrs. Gelder & Kitchen, of Hull.

CAFÉ, HULL.—A new café is being erected for Messrs. Field, in King Edward-street, Hull. The architects are Messrs. Brodrick, Lowther, & Walker, of Hull. The decorative work is being carried out by Messrs. G & A. Brown, Ltd., London.

CHURCH INSTITUTE, DURHAM.—The foundation stone of a new church institute for the parish of St. Oswald's at Durham was laid on the 17th inst. by the Dean of Durham (Dr. Kitchin). The plans of the new building, prepared by Messrs. Cowe, of Chester-le-Street, show a hall capable of seating 300 persons, reading, recreation, and class rooms, together with a lavatory, vestibules, and entrance-hall.

SANATORIUM FOR CONSUMPTIVES, DUNDEE.—A new building for consumptives has been erected at Dundee from plans prepared by Mr. Alexander, the City Architect.

MISSION HALL, BRISTOL.—A new building is in course of erection for the work of the City Mission in St. Jude's, Bristol. It is being erected by Mr. W. Foster, under the supervision of Mr. G. H. Oatley, architect (Messrs. Oatley & Lawrence), by whom the plans were prepared. The new buildings consist of a hall, 50 ft. by 29 ft., capable of seating about 250 persons; and by means of sliding screens, between two of the classrooms opening out of the hall, the seating accommodation can be increased to about 300. In addition to the hall there will be on the ground floor four classrooms and a vestry; and upstairs is a classroom, having seating accommodation for sixty persons. This room will be divided from the hall by movable screens, and will serve as a gallery to the main building. By means of folding partitions there is provision for sixteen classes at the sides of the hall, when used as a Sunday-school.

PROPOSED MEMORIAL HALL, LIVERPOOL.—It is proposed to erect a memorial building to the Rev. Charles Garrett, at Mount Pleasant, Liverpool. The scheme will be carried out by Messrs. Bradshaw & Gass, architects, of Bolton. The large hall will seat 2,250. The smaller hall will seat 700. In addition there will be reception and crush halls, meeting-rooms, clubrooms, vestries, and necessary offices. The two principal entrances will face Newington and Brownlow Hill. A feature will be the tower.

POST-OFFICE, YEOVIL.—A new post-office has been erected at Yeovil. It is situated in Middle-street. The whole of the work has been carried out by Messrs. Bird & Pippard, from designs by Messrs. C. & C. B. Benson, at a cost of between 3,000*l.* and 4,000*l.*

BAPTIST SCHOOL BUILDINGS, FISHPONDS, BRISTOL.—On the 22nd inst. Mr. Joseph Storrs Fry opened a new schoolroom in connexion with the Fishponds Baptist Chapel. The room has been built on a site at the back of the chapel, and it has cost altogether about 1,400*l.* There are six class-rooms 12 ft. by 12 ft., two 20 ft. by 12 ft., and one 25 ft. by 14 ft., the centre hall being 45 ft. by 34 ft. When the classrooms are thrown open there is a room 62 ft. by 45 ft. The builder is Mr. E. Clarke, of Fishponds, and he has carried out the work in accordance with the designs of Mr. Wm. Paul, architect, Bishopston.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, HAYFIELD, DERBYSHIRE.—On the 16th inst. Major Stewart, R.E., an inspector of the Local Government Board, held an inquiry at Hayfield into the application of the Rural District Council to borrow 6,492*l.* for the purpose of providing a public water supply for Hayfield.

BOULTER'S LOCK, BERKSHIRE.—In order to provide for the rapidly increasing traffic upon the River Thames, proposals have been made for an enlargement of Boulter's Lock, near Maidenhead. The lock, which is built of stone, is 144 ft. long, and has a fall of about 6 ft. The projected scheme comprises a lengthening of the lock by 80 ft. up-stream, with an additional pair of gates at the northern end, an enlargement of the present means of transport of punts and small boats by the rails and rollers, and an extension of the wall at the lower gates.

STAINED GLASS AND DECORATION.

MEMORIAL PULPIT, CRABTREE.—A carved oak pulpit has been placed in Crabtree Mission Church as a memorial to the late vicar, the Rev. C. E. Turner, who founded the church. The style is Late Gothic. The octagonal body rests upon the eight exposed constructional timbers, with carved and pierced foliaged tracery springing from the top; the upper portion is divided into two panels in each bay of the octagon. Four of these panels contain painted figures of angels in acts of praise and prayer, treated in a decorative manner, which give life and colour and religious feeling and interest. It is hoped in time to fill the remainder of the panels with figures of a similar character. The pulpit was designed by Mr. T. Rogers Kitsell, of Plymouth, and executed by Mr. J. Carwardine, of Exeter.

CHURCH OF ST. LUKE, CAMBERWELL.—The new font which has just been placed in St. Luke's Church, Rosemary-road, was executed by the brothers Attilio and Giustino Guistini, of Maiono, near Florence, after designs made by Mr. H. P. Horne. The font-bowl consists of a block of red Cippo marble, and has at the angles small columns of yellow Sienese marble with inlaid panels of the same marble in its eight sides ornamented with lilies and the Alpha and Omega. As an instalment of the scheme for the aisle windows to illustrate the Te Deum, two stained glass windows have also been presented by members of the congregation; the two windows contain figures of the Apostles St. Peter and St. John.

FOREIGN.

FRANCE.—The town of Reims has opened a competition, open to both native and foreign architects and sculptors, for a decorative fountain to be erected at the junction of the axes of the Place d'Erlon and the Rue Buviette. A sum of 150,000 fr. is set apart for it, and the designs are to be sent to the Mayor of Reims not later than January 15, 1903.——The jury in the competition for a Salle des Fêtes and a covered market at Sainte-Savine have awarded the first premium to M. Cavé, architect, of Argenteuil, and a second premium to MM. Bourrières & Bourlot of Paris; but no design has been selected for execution——The two bridges of the Ile St. Denis, over the Seine, are shortly to be rebuilt.——It is announced that the new Metropolitan line from L'Etoile to the Place de la Nation will be open to the public early in October, but as far as the Place d'Anvers only. The remainder of the line will not be open till the end of the year.——There is talk of a third Lyric Theatre in Paris, in the new Hippodrome at the angle of Rue Caulaincourt and the Boulevard du Clichy.——The Committee formed for the erection of a monument to Prince Henry of Orleans has accepted the model submitted by M. Raoul Verlet. The monument, which is to be erected on the Cap St. Jacques, at the entry of the river Saigon, is composed of a stele carrying a figure symbolising France bearing in her arms the figure of the dying Prince draped in a flag. At the foot of the stele is a figure representing Geography.——M. Rabel has been elected President of the Society of Architects of the Seine Inférieure.——The municipality of Tarbes has commissioned M. Labat, architect, to prepare plans for the rebuilding of the Lycée of that town, at an estimated cost of 900,000 francs. A sum of 420,000 francs has also been voted for the rebuilding of the Hôtel de Ville on the Place de la Republique.——M. Berlier, the engineer, has proposed to the Chamber of Commerce of Hâvre a project for a subterranean passage under the Seine, towards Tancarville, by means of two parallel tunnels 2,500 mètres in length. The estimated cost is 20 million francs.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. A. W. Ackermann, A.M.Inst.C.E., M.S.I., who has been practising as an engineer and architect in Cape Colony for twenty-six years, the last six being in partnership with Mr. W. Adamson, as Messrs. Ackermann & Adamson, has just dissolved partnership, and is returning to England for some time. His business address is now 47, Victoria-street, Westminster, S.W.——Messrs. Colson, Farrow, & Nisbet, architects, have removed their offices from New-court, Carey-street, to 29, New Bridge-street, Ludgate-circus, E.C.——Messrs. Hart, Son, & Peard, metal workers, have removed their establishment from 88, Drury-lane, to 138-140, Charing Cross-road, W.C.——Professor Beresford Pite, architect, has removed his offices from 48, Harley-street, to 2, York Gate, Baker-street, N.W.

PUBLIC IMPROVEMENTS, BRADFORD.—At the Bradford Town Hall, on the 19th inst., Major J. Stewart, R.E., Local Government Board Inspector, held an inquiry into the application of the City Council for sanction to borrow 25,781*l.* for works of paving, and 2,390*l.* for the purchase of land as sites for three district fire stations, and for consent to the appropriation and use for a similar purpose of certain land at Highfield-road, Dudley Hill.

TIMBER TRADE OF GOTHENBURG.—Mr. Duff, British Consul at Gothenburg, reporting on the trade and commerce of that district for the year 1901, states that traces of the general industrial depression have already been felt in the labour market there. In the timber trade a large reduction has taken place, which has caused the discharge of a number of hands, and a reduction of wages of from 10 to 30 per cent. The workmen of the mechanical establishments and joinery factories have had to submit to shortened hours, and consequently a decrease in wages. The builders' trade is especially suffering from serious depression, and, in connexion therewith, many other industries. The year 1901 was rich in surprises, and will not soon be forgotten by those engaged in the wood trade. The immediately preceding years offered both exporters and importers opportunities of doing good business, while, on the other hand, last year exposed both parties to serious losses. During the period from February to the end of August, prices incessantly declined week by week, and the fall was so complete that no foresight could prevent the considerable losses which were incurred on the major portion of stocks accumulated, and which made 1901 more remarkable than the memorable year 1879. While particularly extensive sales of timber were made during the earlier part of 1900 for shipment in the spring following, a very small proportion only had obtained buyers at the commencement of last year. Added to this came the fact that stocks at the export centres were largely on hand with the importers. Apprehensions as to the future were certainly felt, but the confidence derived from the preceding advantageous years, accompanied by rising values, perhaps caused the seriousness of the position to be under-rated. The first actual fall in prices took place in February, when large lots of 2 by 4-in. and other 2-in. dimensions were disposed of to London, but the reduction in price then made was found to be altogether inadequate, and during the second quarter this reduction reached 1*l.* 10*s.* to 2*l.*, which, however serious and unfortunate alike for sellers and buyers, may be said to have been warrantable in view of the large stocks then remaining on the hands both of exporters and importers. Towards the end of October and beginning of November an improvement took place, and certain sales were concluded at from 1*l.* to 1*l.* 10*s.* in excess of the prices ruling in July and August. Appended to Mr. Consul Duff's report are some notes from the Vice-Consul at Halmstad, who remarks, *inter alia*, that "of square timber large quantities were shipped in 1901 to Denmark and Germany, the largest buyers in this line, and a fair quantity to the United Kingdom. The export, however, was less than during the year previous and prices were lower. The export of sawn goods was also rather less."

AMERICAN ROOFING SLATES.—The British Commercial Agent in the United States (Mr. Bell) writes that, for the last five years that country has exported to the United Kingdom roofing slates of the value of over 1,000,000 dols. per annum. The quantity exported during the last fiscal year was valued at 945,352 dols., practically all going to the United Kingdom. Mr. Bell suggests that if British quarries were equipped with machinery for extracting and transporting the slate of the latest design there ought to be no difficulty, in view of the distance it has to be carried, in shutting out a good deal of the American product.

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, South Kensington, which now occupies rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition-road, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Technical Education Board of the London County Council and by the Drapers' Company are vacant. The day classes of the school are held from 10 to 1 and 2 to 5 on five days of the week, and from 10 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

THE PREVENTION OF DUST AND MUD.—The proprietors of the *County Gentleman* recently offered to contribute towards the cost of sprinkling two or three miles of main road with heavy oil, with a view to ascertaining whether the oil treatment of roads would be as successful in fixing the dust and preventing the formation of mud in this country as it has proved in some parts of the United States. Arrangements have now been made with the Hampshire County Authorities for oiling a section of the main road from Farnborough Station towards Aldershot. This road forms part of the main line of communication between London, Winchester, and Southampton. It is exceptionally suited for this experiment, as it is a dusty road, much frequented by motorists and cyclists, and one carrying a large traffic. Great interest is being taken in the experiment, for not only does the dust raised by motor-cars on the country roads cause much annoyance, but it is also a serious danger to health. Any one following immediately in the wake of a motor-car breathes for the next few minutes not air, but dust, and the great bacteriological discoveries of Pasteur have proved the presence of myriads of microbes in dust. Dust is one of the means by which diseases of the respiratory organs are communicated. Doctors and Local Authorities have long waged warfare against the introduction of impurities into the human system by water. It is felt by many that it is time action was taken to prevent their introduction by means of dust. The arrangements for the experiment are in the hands of Mr. W. J. Taylor, Assoc.M.Inst.C.E., the County Surveyor of Hampshire, and of Mr. W. Rees Jeffreys, who is acting for the *County Gentleman*. The oil can only be placed upon the roads when they are thoroughly dry and a warm sun shining upon them. The experiment will accordingly not be made until these conditions obtain.

BIRMINGHAM INFECTIOUS DISEASES HOSPITAL.

—On the 19th inst. Dr. F. St. George Mivart, Local Government Board Inspector, held an inquiry at the Birmingham Council House in reference to the application by the City Council for sanction to borrow 18,868*l.* for the extension of the Infectious Diseases Hospital at Little Bromwich. The Town Clerk explained that it was originally intended that ten pavilions should be erected, but of those only four had at present been built. The Committee had secured plans for the building of three additional permanent pavilions, making seven in all, an isolation ward, and a home for fifty nurses. The total cost of the work was estimated at 18,868*l.*, which amount was divided up as follows:—Nurses' home, 4,200*l.*; three pavilions, 10,305*l.*; isolation ward, 1,538*l.*; fittings and furniture, 1,575*l.*; road making, 250*l.*; architect's commission and clerk of works, 1,000*l.*

MEMORIAL TABLET, WARRINGTON.—On the 23rd inst. Principal Drummond, of Manchester College, Oxford, unveiled a tablet on an old building at Warrington. The tablet bears the following inscription:—"The Warrington Academy was established in this building in 1757, removed to larger premises in what is known as Academy-street in 1762. This tablet was erected in 1902 by the Warrington Society." The tablet is of Wedgwood ware, bears a representation of the founder of the institution—John Seddon—and was designed by Mr. A. Warburton. It has been wrought by Messrs. Wedgwood & Sons, of Etruria.

ALGERIAN MARBLES.—Mr. Scratchley, his Majesty's Vice-Consul at Phillipeville, draws attention to the marbles that can be obtained in Algeria. The quarries at Chemtoll, he states, produce the most beautiful onyx marbles in the world. The interior of the new Town Hall at Constantine is decorated with them. The grand staircase and *salles des fetes* are lavishly adorned with the most delicately veined and coloured onyx. "It is a great pity," remarks Mr. Scratchley, "that these marbles are not better known. A new quarry has been discovered near Ain M'lila, from which I have seen specimens of pure white, rose, and yellow onyx, quite uniform in tinting."

CEMENT TRADE WITH BANGKOK.—The extensive building which has been going on in Bangkok for some time has caused a considerable increase in the import of cement, which, according to statistics furnished by the authorities, has risen from 11,275 casks, valued at 5,411*l.*, in 1898, to 25,972 casks, valued at 13,796*l.*, in 1901. Of this latter total, only 921 cases came from the United Kingdom, whereas Denmark sent nearly one half of the whole quantity, Germany sent 6,656 casks, Italy 3,597 casks, and Singapore 1,912 casks.

SICILIAN ASPHALT.—The shipments of asphalt made from the whole of Sicily during 1901 amounted to 62,770 tons, of which 7,630 tons were sent to the United Kingdom—4,630 tons being shipped from Syracuse and 3,000 tons from Mazzarellis. The exportation was less than in the preceding year, the smaller demand being attributed to the failure of several German firms, and to the low rate of exchange. Since 1900, new deposits of asphalt have been discovered at Vizzini, most of which have been bought up by the French company, who have important mines at Ragusa. At that place also the Sicula Co. have a steam factory for the extraction of the bitumen from the asphalt rock and compressing it into blocks, and also for pulverising the asphalt rock ready to put into bags.

EXPORT OF WORKS OF ART FROM ROME.—In a recent report on the trade and commerce of Rome, Mr. Morgan, the British Consul, remarks that the city at one time used to export works of art on a large scale, but that during late years there has been a serious falling-off in that class of business. This, he suggests, is probably due to two causes: the first is the strict enforcement of the rules bearing upon the transfer from the country of works of art, chiefly specimens of ancient art; and the second is the tendency on the part of the present generation to follow commercial pursuits as yielding more tangible and early profits than an artistic career. The value of the paintings, statuary, &c., exported in 1898 was 116,930*l.*; in 1899 it was 113,115*l.*; in 1900 it was 103,483*l.*; and in 1901 it fell to 83,946*l.*

SIAMESE TEAK.—It is estimated by the British Consul at Bangkok that the export of teak from that port last year amounted to 50,408 tons, of which 13,157 tons were shipped to Europe, 20,043 tons to India, and 11,145 tons to Hong Kong. The export to India has been increasing every year, the timber being largely used by the railways and for house building. The European figures show an increase of nearly 2,000 tons over the previous year, despite the fact that the total import of teak into Europe from all countries in 1901 was only about two-thirds of the import of 1900. Apart from ship-building, the demand for teak in England for general purposes, building, furniture, &c., is largely increasing, and many orders now come from Europe for timber cut to special sizes. The f.o.b. value of timber shipped from Siam was about 9*l.* per ton for the European cargoes and 5*l.* per ton all round for the rest. The local market prices for rough logs obtaining during the year showed a considerable falling off, especially when the fall in the exchange value of the tical is considered. As to the prospects of the teak export trade of Siam in the immediate future it is difficult to speak, as opinions differ as to the effect that the new Government forestry regulations will have upon the output. Shipments during 1902 are expected to be moderate, and the output will probably be diminished during the next few years. The teak trade, both in the forests and in Bangkok, continues mainly in British hands. It is one which requires large capital, and the small trader has been almost eliminated. The exports of woods other than teak, *i.e.*, agilla, sapan, paddo, yellow box, ebony, rose, &c., show no advance.

THE "OWEN JONES" PRIZES FOR DESIGNS.—Six prizes, to consist in each instance of a copy of Owen Jones's "Principles of Design" and the bronze medal of the Society of Arts, will be offered for competition next year amongst students of Art Schools, and will be awarded upon the results of the annual competitions held by the Board of Education, South Kensington. The prize fund consists of a capital sum of 400*l.*, being the balance of the contributions to the Owen Jones Memorial Fund, which the Memorial Committee presented to the Society of Arts, who undertook to expend the yearly interest upon prizes for the best designs in respect of household furniture, wall-papers, hangings, carpets, and similar decorative work, after the principles enunciated by Owen Jones.

NATIONAL ASSOCIATION OF MASTER HOUSE PAINTERS.—The annual convention of the National Association of Master House Painters and Decorators was begun on the 23rd inst. in Newcastle-on-Tyne, Mr. J. Graham Cole, of Newcastle, presiding. After a municipal welcome by the Mayor (Alderman H. W. Newton), the President said that in his visits to the local associations he was glad to see a general awakening to the fact that, if they wished to be respected and to have their work appreciated by the public, they must not only educate themselves, so far as the trade was concerned, and keep themselves abreast of the times, but they must see that those who were following them and taking their places were also educated. He had been delighted to find technical schools doing splendid work in most of the cities and towns he had visited, and working under efficient masters of their craft. Up to the present, however, the technical schools had dealt only with apprentices, and he suggested that the time had arrived when they should institute continuation classes for those who had passed their apprenticeship. He was glad to know that his views in this matter were shared by the Presidents of the Scottish and Irish National Associations. He suggested that in each town and city employers should call meetings of the operatives and confer with them, and so get their co-operation if possible. He had been pleased to see that a great amount of attention was given to colour studies at the various schools and exhibitions. The interiors of our homes were often spoiled for want of this knowledge. Students should study colour as if they were studying music. The decorator who was a master of colour not only had it in his power to make the home beautiful, but was able to dispense happiness in connexion with the work in the schools. He advocated the establishing of a first-class training national technical school in some central position in the country, saying that the reports received from such schools in Germany convinced him that such an institution would be of the greatest value to the craft. The present technical schools were, after all, only of an elementary character.—An exhibition of decorators' work was opened by Mr. J. D. Crace, of London, President of the Institute of British Decorators, who said the Association had never taken up any subject more valuable than that of promoting the education of those who were to succeed them. It was impossible to exaggerate the value of technical schools, but only, he held, as supplementary to an apprenticeship. He did not believe that any youth would ever learn a trade from a technical school alone. In technical schools everything was made comparatively easy, but in apprenticeship the boy was left to his own resources, face to face with work comprising all the irregularities and possibilities of failure.

GREENCOAT TECHNICAL CLASSES, CAMBERWELL GREEN.—The technical and art classes held at the Greencoat School, Camberwell Green, S.E., resume work for the twenty-third session on Monday, September 29. These classes are in affiliation with the Technical Education Board of the L.C.C., the City and Guilds' Institute, and the Board of Education; and of late their usefulness has been considerably increased by the help of the Technical Education Board's grants in aid of equipment. By this means a very valuable collection of models and apparatus has been provided for the use of students employed in the building trade.

LEGAL.

CASE UNDER THE LONDON BUILDING ACT.

AT the Guildhall, before Mr. Alderman Vaughan Morgan, Messrs. Harrison & Spooner, builders, appealed against a notice served upon them by Mr. Hugh McLachlan, District Surveyor for the western division of the City, objecting to certain works being carried on by them upon buildings situate at Nos. 14 to 17, Holborn Viaduct. Mr. J. P. Grain, who appeared for the appellants, said the Holborn Land Company, who were the lessees of these premises, proposed, by opening the party walls, to make it into one building. Mr. Savill, chief clerk, pointed out that under the London Building Act this could only be done if the premises were in one occupation or were so adapted. Mr. Grain said he should contend that the Holborn Land Company were the sole occupants. The great point, of course, was whether the building was supplied with sufficient means of escape in case of fire. If the ideas of the builders were carried out the premises would be far safer in that respect than they were at present. The scheme, moreover, was approved by the fire insurance company insuring the property. Legally, the question of occupation was a very wide one, and had never been very clearly defined. The Alderman held that the premises were not in one occupation, or adapted so to be. He therefore dismissed the appeal.

COPING-STONE FATALITY IN SHEFFIELD.

IN the Stipendiary Court of the Sheffield Court House, on the 16th inst., the City Coroner (Mr. D. Wightman) resumed the inquest formerly opened on the 9th inst. touching the death of Joseph Stringfellow, labourer, of Eyre-street, who was killed on the 6th inst. by the fall of a coping-stone and some lead from business premises in Market-place, of which Messrs. W. H. Smith & Son, the railway-bookstall owners, are the lessees. A plan and a model, prepared by Mr. E. A. Green, Chief Building Inspector to the Corporation, was used to assist those engaged in the inquiry. According to the *Sheffield Daily Telegraph*, Mr. William Colver had written an account of what he saw of the accident, and this was read by the Coroner. "I should say," said Mr. Colver, "there was only a few minutes' interval between my attention being called by one of my assistants to the dangerous condition of the upper part of the building and the occurrence which proved so disastrous. As soon as I saw that it was dangerous I at once sought an interview with the representatives of Messrs. Hepworth and Messrs. Smith & Sons, all in the same building, and cautioned them, doing my best to infuse into them some of the serious apprehension that I had in my own mind. Unfortunately, the principals of both concerns were on their holidays. I, however, did ascertain from one of the assistants that some men, under the direction of Messrs. Wood & Son, of Queen-street, had been working on the back roof. After a few minutes I found Mr. Bradley, who had charge of the work, and Mr. Bottomley, his building superintendent. They came to me, and we had a hurried conference as to what was best to be done. They told me that they had examined the front part of the roof, and found the cornice somewhat bulged, and that they could not do any more that day, as they would require scaffolding out of the upper windows, and further that they would have to get the sanction of the City Surveyor to do so. . . . I telephoned urgently to the City Surveyor's office. Mr. Bradley went to see Mr. Wood, while Mr. Bottomley went for the City Surveyor. I must say that my request was obeyed most expeditiously, and in less than five minutes Mr. Green, the Building Surveyor of the Corporation, arrived. I then left the three together, and returned to my personal duties. However, before any measures could be devised to meet the difficulty, and within two or three minutes of my leaving the street, the crash came."

In answer to Mr. Neal, Mr. Colver added that he had not previously noticed that the roof was unsafe, although several weeks before the accident it was reported to him that the roof was not watertight. There was a leakage into the rooms which he occupied. It was no part of his duty to repair the roof.

A complaint was made about a month prior to the accident by one of his managers to Messrs. W. H. Smith & Son as to the state of the roof, and several weeks elapsed before the repairs were commenced.

Mr. Tom Lee, assistant to Mr. W. Colver, said about eleven o'clock on the morning of the accident he was on the top floor of the building from which the coping-stone fell when Mr. Bradley and other men came to attend to the leaking roof. Mr. Bradley called his attention to the two rows of bricks which were bulging out. Witness said they should be attended to at once, and Mr. Bradley agreed with him. The accident happened about twenty minutes after his conversation with Mr. Bradley. He had never heard any one suggest danger before that morning. The roof leaked about a year ago, and the last leakage commenced six or seven weeks ago.

By Mr. Neal: Witness complained of the leakage, but nothing was done until the day before the accident, when a workman called to see where the leakage was. The leak was near to and underneath the piece of the coping that fell. Mr. Bradley and Mr. Bottomley agreed with him that there was danger, but they did not give any reason for suggesting that the repair should be left until Monday. He did not think the coping-stone would fall so soon as it did.

Mr. Thomas Bottomley, builder, said Mr. Bradley came to him at nine o'clock on the morning of the accident, and asked him to look at to repairing the roof and skylight of the building. He went on the roof, measured for the skylight, and then went to the front, and found that the gutter had slipped

from underneath the slates. He went into the street, and looking up saw that the brickwork and coping were bulging out about 3 in. He went with the witness Bradley and reported the matter to Mr. Wood, who returned with them to the place, and said it must be attended to at once. When Mr. Bradley, senior, arrived there was some talk of getting out a scaffold. Asked as to the cause of the accident, witness replied, "Old age." Pressed for particulars, he explained that the coping-stone was held by a piece of lead. The width of a brick was an exceptionally narrow basis for a coping-stone. On that basis it had tilted 3 in., but he thought it might hold until Monday with the lead.

In reply to the Coroner, witness added that after what Mr. Green said the scaffolding would have been put out on Saturday afternoon had the accident not occurred.

Mr. George Bradley, who was called to attend to the leakage, explained to the jury his reason for believing that the coping would stand until the Monday, adding that he, too, thought the coping was of wood, and that Mr. Wood, after Mr. Colver had intervened, said to him, "Whatever is necessary do." In his opinion, there were two causes for the accident, first, that the telephone post had pushed the roof, and second, that there were no through ties.

Mr. Neal said he was informed that the building was put up in 1792.

The report of Mr. Green, Chief Building Inspector for the Corporation, was read by the Town Clerk.

Mr. Neal (to Mr. Green): You have now gone carefully into the cause of the accident?—Yes.

What in your opinion is the cause?—Faulty construction.

Was there any difficulty in that being discovered by a reasonable inspection of the roof?—Yes, there was some.

In reply to the Coroner, witness said he thought it was bad judgment to think it was safe to leave the repairs until Monday.

The Coroner, in directing the jury to the chief points for consideration, said the first was, Was there any neglect in attending to the matter? And he thought they would come to the conclusion that there was no very great neglect as soon as the danger was fully ascertained. The bad construction of the building seemed to have been the primary cause of the accident, and personally he was inclined to think there was no mistake which might not have been reasonably made. If the jury were also of that opinion their verdict would be that Stringfellow lost his life by an accident.

The jury, after over half an hour's absence, returned a verdict that deceased was killed by a falling cope stone from a building which had been allowed to get into such a state of disrepair as to constitute a public danger.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

10,447.—IMPROVEMENTS IN LEVELS: *W. F. Stanley and H. T. Tallack.*—A spindle that carries the pinion of the rack is inserted through the casing, the rack is fitted on to the draw-tube, and the support for the spirit level, the body of the telescope, the centre, and the objective collar are all cast in one piece.

10,450.—WORKING OF WOOD: *A. A. Westman.*—Rotatory cutting tools for grooving and tongueing wood consist of two halves, whereof one can be adjusted along the shaft whereby the width of the groove or tongue can be changed. A boss and key-way key the one half on the shaft; the other half, which is adjustable upon the shaft, is joined to the former half through the engagement of a hole and pin. When the two halves are put together, two sets of teeth cut the sides, respectively, of the grooves, and two other sets cut the contact surfaces or shoulders. An arrangement, parallelwise, of the sets of teeth of the tongueing cutter provides for a constant width of groove when the front faces of the sets are ground off to an equal extent.

10,455.—A COMPOSITION FOR USE IN FLOORING: *P. Confalonieri and N. Confalonieri.*—An adhesive compound for use in laying wooden flooring boards upon a foundation of mortar consists of 100 parts of dry tar, 5 of pitch, 3 of resin or pitch resin, 1 of light naphtha oil, and 0·50 of ground sulphur. The boards are treated with a hot coating of the composition and are then sprinkled over with sand or dross, or fragments of earthenware, glass, metal, &c.

10,468.—DOORS FOR HOSPITALS, LAVATORIES, REFRIGERATORS, DRYING-ROOMS, AND SO ON: *A. J. Wallis-Tayler and E. Whitehead.*—For maintaining a uniform degree of temperature, preventing the passage of smells, and for similar purposes, the inventors devise a pierced cylinder that revolves upon pivots at its middle between curved wings; the dimensions of the parts are such that a through passage for air cannot be maintained. The cylinder will carry strips of rubber or spring-pressed strips of wood for an air-tight joint between it and the wings, roof, and floor.

10,481.—BRAKES FOR PIT-CAGE, LIFT-CAR, AND SIMILAR MECHANISM: *E. E. Bartlett and W. Shinn.*—The arms of a shaft are worked with an arm which is moved to apply the brakes by a spring, which otherwise is held back by a rod that is pivotted in the arm, to the arms of the shaft are linked the brake-blocks. The spring will come into play when a handle is worked to open a split nut that retains the rod, and additional pressure ensues when (the split nut being closed) the rod is turned by another handle so as to force serrated blocks against the guides; the latter process serves for the ordinary application of the brake.

10,536.—WHEELS FOR BARROWS; *E. B. Peirce.*—The wheel has flat treads and a groove for a rail, a fork, of which a stud carries a sleeve, supports the axle. A nut above the sleeve enables one to adjust the relative places of the body and the shafts in respect of the wheel of the barrow.

10,543.—BURGLARY-PROOF STRONG-ROOMS: *A. B. Chatwood.*—The inner walls are built up with steel plates around which are secured horizontal rails at distances not exceeding 1 ft. from one another. The rails may be sustained either upon pockets made in the brick or concrete outer walls or upon brackets of the columns that carry the roof girders. Concrete is filled into the roof and the space between the inner walls and the brick walls. For a strong-room separated from an outer wall is provided an outer plate wall fastened on to rails carried by brackets on the outer sides of the columns or by pockets in the concrete. In another form two sets of columns replace the shell plates, and horizontal rails are laid on each set at different levels.

10,552.—A CIRCULAR SAW FOR CUTTING WOODEN PAVEMENT BLOCKS, AND OTHER USES: *W. E. Rickard.*—A sliding frame carries the common spindle of a set of circular saws; reversing gear for the shaft of the reciprocating mechanism comprises open and crossed belts that run upon pulleys, and a sliding bar works a friction clutch block. A nut that is worked by a screw on the shaft and is joined by a rod to the bell crank that reciprocates the frame, will effect the reversal automatically at the end of each stroke as it meets stops upon the sliding bar; or the reversal can be made with a hand lever. The timber is clamped during the sawing process with springs on a shaft worked by a cam.

10,591.—A MOVABLE SCAFFOLD: *J. Rollinson.*—The scaffold, devised for use in the construction of tanks and gas-holders, has three uprights mounted upon wheels and joined by means of radial telescopical tubes or timbers to a plate upon a middle post or pivot which is held up with adjustable stays secured to the bottom of the tank. The uprights have brackets from which planks or platforms may be hung with tackle.

10,614.—AN APPLIANCE FOR USE IN MANHOLES: *H. F. Coales.*—In order to prevent flooding, a stopper is fashioned with discs that are threaded upon a screw and are forced towards one another by means of a screw-handle which presses a rubber ring into grip with the sides of the manhole. A vent for inspection can be made in the stopper. The flange of a disc that presses against a packing-ring, and is fastened with a bayonet-joint, may otherwise be adopted.

10,622.—A NOISELESS PAVEMENT: *P. Timofeeff.*—Angular well-washed and finely-sifted quartz sand, wetted with some adhesive liquid, is filled into boxes that are laid as are the blocks of a wooden pavement. The sand is wetted and stamped and its surface is then rolled. The framework may consist of a bottom of brick to absorb excess of water with an overlay of rough or hewn stone, and the stability of the pavement can be increased by means of triangular strips disposed along the bottoms of the boxes. For a binding material are specified a variety of substances, such as iron, chrome-iron, ores, and iron shavings. To the sand may be added potato-flour, ground peat, or similar deliquescent or hygroscopical materials.

10,633.—ROOF DOORS OF DUST CARTS: *S. Berger.*—The hinged doors are joined to ropes around pulleys and a roller, and thence to the bottom rung of a ladder at the back of the cart, having teeth set in gear with the wheels upon a roller. The doors are opened by the weight of the dustman upon the ladder, but as he steps off they will become shut through their own weight, and, at the same time, lift the ladder. Bearing-rollers have guides for the ladder, and a hinged door is fitted at the rear of the cart.

10,646.—APPLIANCES FOR WINDOW SASHES: *J. Robertson.*—Means for removing sashes from the frames are provided by rebated pulley-stiles that take a wide lower sash and a narrow upper sash, and the cutting away of the lower parts of the parting-beads. The upper sash is drawn down so as to clear the beads for its removal, and the lower sash is similarly lifted. The sash is prevented from turning too soon with spring catches or turn-buttons upon the sash-stiles, which are rebated or checked for the cords.

10,657.—EXTINCTION OF FIRE: *W. L. Young.*—The fire severs a fusible link and thus enables the descent of a spring-piston to explode a cartridge, which may also be exploded with an electrical current that is closed by the fusion of an insulator. A rod, struck by the bullet, breaks the acid bottle, and the mixture of acid and alkali generates a pressure which discharges liquid through a rotating and spreading nozzle; the fusing of the link effects contact of the terminals of a circuit that comprises an alarm and an indicator, but the apparatus can be worked by hand, as the automatical starting-contrivance is removable.

10,710.—COVERINGS USED IN BUILDINGS, AND FOR PIPES, BOILERS, COLD-WATER TANKS, &C.: *A. J. Lawson and G. Hutchinson.*—A non-conducting composition which is described as being available for use in the construction of fireproof walls, floors, ceilings, and so on, as well as for covering steam-pipes, boilers, cold-water tanks, and refrigerators, contains about 55 per cent. of carbonate of lime mud obtained from the decomposition of alkali waste, 15 per cent. of papier maché and of asbestos or other fibre, 10 per cent. of clay, and 5 per cent. of flour, size, or some such adhesive ingredient.

10,726.—CASEMENT AND SIMILAR FITTINGS: *A. Weber and J. Schön.*—In order that French windows and casements may be opened to any extent required the inventors devise two tubular sections having ratchet teeth at their adjacent ends, one section, passed through a bracket and a squared axis, is joined to the window, the other is joined to the frame of the window; spiral springs force the teeth into gear, and a pull upon a chain at the one end of a lever whereof the other end is joined to the squared axis raises them out of gear; one closes the window by pulling the chain and so disengaging the teeth; when it is opened the ratchet teeth slide over one another, as the axis lifts its corresponding section.

10,770.—DRY GAS-METERS: *A. Schofield.*—Two dished diaphragm chambers are screwed on to externally threaded nozzles attached to the gas-opening upon the middle partition, an interior annular groove in the upper edge of each chamber holds the flexible diaphragm with a ring that grips the edge; the capacities of the chamber and the diaphragm are about equal, the latter will be quite taken within the former when it is in its inner position, a spring or bayonet-joint fastens the chambers on the passage for the gas.

10,703.—AN INDICATOR FOR ELECTRICAL BELL CIRCUITS: *W. J. Polyblank.*—In one form of the contrivance it is arranged that the operating coil, which is wound upon a core, shall act as a solenoid on an iron magnetical core. A non-magnetical bar connects the core to the lever of the indicating disc. The energisation of the coil draws in the magnetical core and so causes the disc to work. All the resetting coils may be embraced in a single local circuit if a series of indicators is used, and the strength of the field within the coil may be enhanced, for a given strength of current, by securing the coil and bobbin to the base with a sheet-iron strap, or by wrapping the coil within the sheet-iron sheath.

10,831.—JUNCTION-PIECES AND SLEEVE-JOINTS FOR PIPES: *G. Fischer.*—For screw sleeve-joints the screwed sleeve is fitted over the plain ends of the pipes, and hexagonal nuts having projecting flanges at their ends compress rings or washers. The sleeve is hexagon-shaped at its enlarged middle part. The joint is described as being available for use with tees, crosses, bends, and similar junction-pieces.

10,844.—APPLIANCES FOR LIME-KILNS: *W. Siefen.*—The invention relates to kilns that have a semicircular plate in the opening for discharge, the lime being taken out from both above and below it. To the back of the plate are secured two horizontal and curved arches or bars with short bars between them that lie upon the curved bar and upon a bar beneath the transverse support of the plate: by those means the charge is sustained in the middle of the kiln, whilst the lime which has fallen from the back can be taken out from underneath the plate. The diameter of the lower portion of the funnel-shaped throat of the kiln is half that of the body of the kiln.

10,853.—HYDRAULIC LIFTING APPARATUS: *E. B. Ridgway.*—In a machine worked by steam, together with a hydraulic chamber, an auxiliary cylinder, fitted in part with water covered with oil, is joined by a pipe to the hydraulic lifting-chamber. A slide-valve, which is worked with a lever as and when a non-return valve is worked in the pipe, admits the steam. The auxiliary cylinder is lined with wood, and to prevent the water in it from rising to a too high level, a chamber containing a ball-cock is set in communication through pipes with both the bottom and top of the cylinder.

10,857.—MANUFACTURE OF CEMENTS: *Fellner and Ziegler.*—Portland or other cement is made from a molten material, such as blast-furnace slag, which is conveyed from a trough to the middle of a stepped cone which is quickly rotated; centrifugal force and a supply of compressed air disintegrate the material, whilst the air oxidises sulphur in the slag and cools the cone, which has a water-jacket for its casing.

10,946.—GRADUATION OF SCALES UPON RULERS: *E. Perron.*—Reducing or enlarging scales are marked upon the edge of the ruler, and are to be read in opposed directions from a common zero-point. A drawing can be reproduced by turning the ruler about its pivot at that point. Whenever a given point upon the drawing comes into contact with the graduated edge one marks off the corresponding length at the corresponding point of the other scale.

MEETINGS.

FRIDAY, SEPTEMBER 26.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. J. Steegmann on "Mechanical Physics: Laws of Motion, Hydraulics, &c." 7 p.m.

SATURDAY, SEPTEMBER 27.

Incorporated Association of Municipal and County Engineers.—Midland District meeting at West Bromwich.

MONDAY, SEPTEMBER 29.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. J. Steegmann, on "Natural Forces; Light, Heat, Electricity, Chemistry." 7 p.m.

WEDNESDAY, OCTOBER 1.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. J. Steegmann, on "The Atmosphere; Pressure and Composition; Air, Combustion, and Respiration." 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

FRIDAY, OCTOBER 3.

Architectural Association.—Annual general meeting (1) Address by President, Mr. H. T. Hare; (2) Distribution of Prizes. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. J. Steegmann, on "Meteorology." 7 p.m.

SATURDAY, OCTOBER 4.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Wimbledon Sewage Works.—2.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 6.—By R. GRAY & SONS (at Whitby).

Fylingdales, Yorks.—Foulside Farm, 106 a., u.t. 240 yrs., g.r. nil, y.r. 55*l.* £1,700
Brook Farm 36 a. 2 r. 20 p., f., y.r. 62*l.* 1,760
Raw, a freehold cottage, y.r. 3*l.* 115
Ugthorpe, Yorks.—Franklands Farm, 31 a. 3 r. 23 p., f., y.r. 30*l.* 1,010

September 10.—By M. B. HODGSON (at Windermere).

Windermere, Westmorland.—Black Moss Farm, 113 a. 2 r. 24 p., f. and c. 1,010
Heaning Field, 5 a. 0 r. 5 p., c. 360

September 11.—By COOPER & PRESCE (at Ross).

Upton Bishop, Hereford.—Daubie's Farm, 195 a., f. 1,930

September 12.—By G. B. HILLIARD & SON (at Chelmsford).

Rettendon, Essex.—Woods Farm, 50 a. 2 r. 38 p., c., y.r. 30*s.* 500
A freehold and copyhold field, 2 a. 1 r. 20 p. .. 145
Little Baddow, Essex.—Holly Cottage, f., p. 202
Chelmsford.—108, Moulsham-st., f., y.r. 13*l.* 185
Anchor-st., &c., three plots of building land, f... 112

September 13.—By C. M. STANFORD (at Colchester).

Colchester.—Lexden-rd., Upperhill House, f., p... 1,850
Lexden-rd., enclosure of pasture, 2 a. 2 r. 1 p., f. 1,025
Weeley, Essex.—Botany Farm, 121 a. 0 r. 30 p., f. 1,500
House, three cottages and 5 a. 2 r. 25 p., f. and c. 760
Freehold residence, with steam mills, farmery, &c., area 13 a. 1 r. 17 p. 750
St. Osyth, Essex.—Pannells-gr. enclosures, 36 a. 0 r. 8 p., f. 625
Amper's Wick Estate, 92 a. 0 r. 30 p., f. 2,820
New House Farm, 42 a. 3 r. 14 p., f. 840
Great Horkesley, Essex.—Enclosures of land, 6 a. 2 r. 6 p., f. 150

By HOOKER & WEBB (on the Estate).

Edenbridge, Kent.—Stangrove-rd., &c., 22 plots of freehold building land (in lots) 2,258

September 15.—By NIGHTINGALE, PHILLIPS, & PAGE.

Kingston-on-Thames, Surrey.—London-rd., Norbiton-pl. and 3½ a., f., p. 3,000

By A. G. & A. NOTLEY.

Kalgoorlie, Western Australia.—The Lake View Extended Gold Mine, area 24 a., gold mining lease for 14 yrs., with option of renewal 3,400

September 15.—By WHITE & SONS.

Box Hill, Surrey.—Pixham-lane, Purbrook and 1¼ a., u.t. 37 yrs., g.r. 15*l.*, y.r. 132*l.* 1,750
Thakeham, Sussex.—An enclosure of meadow land, 5 a. 3 r. 25 p., f. 190

By JENKINS & SON.

Brockley.—137, Brockley-rd., u.t. 60 yrs., g.r. 6*l.*, e.r. 40*l.* 300

September 16.—By S. WALKER & SONS.

Minories.—7, King-st. (S), also 7, Little Tower Hill (S), f., w.r. 154*l.* 14*s.* 1,350

By MORGAN & SONS (at Masons' Hall Tavern).

Hackney-rd.—Great Cambridge-st., the Victory Tavern, u.t. 24 yrs., y.r. 100*l.*, with goodwill 2,800

September 17.—By BREADMORE & WEBB.

Willesden Green.—296 and 298, High-rd., with shoeing forge, yard, stabling, &c., area 4,790 ft., f., e.r. 65*l.* 700

By FRITH, GARLAND, & CO.

Harringay.—73, Effingham-rd., u.t. 89 yrs., g.r. 7*l.* 5*s.*, e.r. 42*l.* 470
Tottenham.—38, Abbotsford-av., u.t. 84 yrs., g.r. 5*l.* 10*s.*, e.r. 32*l.* 300

By P. & G. GREEN.

Aldgate.—1 to 9 (odd) and 8 to 20 (even), Aldgate-av., block of shops, warehouses, and offices, u.t. 92 yrs., g.r. 1,325*l.*, y.r. 3,548*l.* 12*s.* 2,080

By ORGILL, MARKS, & LAWRENCE.

Brighton, Sussex.—Edward-st., The Great Globe Distillery p.-h., f., y.r. 100*l.*, reversion in 59 yrs. 2,000

By SPARROW & SON.

Finchley.—Ballards-lane, Redbourne Cottage, u.t. 78 yrs., g.r. 10*l.*, y.r. 65*l.* £805
9, Alexandra-grove, f., e.r. 65*l.* 800

By C. P. WHITELEY.

Amersham Common, Bucks.—White Lion-rd., The Pine Apple b.-h., with two cottages and 5 a. 2 r. 30 p., f., y.r. 42*l.* 1,930

By FOSTER & CRANFIELD.

Walthamstow.—Chingford-rd., Aveling's Farm, building estate, 33 a. 0 r. 31 p., f., y.r. 92*l.* 10*s.* 8,800
Sydenham.—23, Russell-st., f., w.r. 16*s.* 18*s.* 180
Croydon.—20 and 22, Mitcham-rd., f., w.r. 33*l.* 16*s.* 300

By ROBERT & ROGERS JONES (at Llanrwst).

Eglwysfach, &c., Denbigh.—Dyffryn Farm, 46 a. 2 r. 0 p., f. 1,690
Croesonen Farm, 96 a. 0 r. 34 p., f. 1,730
Ffridd Newydd holding, 25 a. 0 r. 21 p., f. 470
Ffraid Villas (two), f. 335

By HAWKES, RISDONS, & ANDREWS (at Tiverton).

Uplowman, &c., Devon.—Hill and Higher and Lower Murley Estate, 265 a. 1 r. 8 p., f., y.r. 210*l.* 3,700
Sampford Peverill, Devon.—Three closes of land, 10 a. 2 r. 25 p., f. 304

September 18.—By H. J. BLISS & SONS.

Clapton.—Dunlace-rd., f.g.r. 5*l.* 10*s.*, reversion in 65 yrs. 143

By ALLAN BOOTH.

Kentish Town.—11, Bartholomew-rd., u.t. 56 yrs., g.r. 6*l.*, p. 625
Hackney.—64 and 66, Lauriston-rd., u.t. 40 yrs., g.r. 12*l.*, y.r. 72*l.* 700

By MARK LIELL & SONS.

Clapton.—111, 113, 121, 123, and 125, Glenarm-rd., u.t. 73, 72, and 70 yrs., g.r. 24*l.* 10*s.*, w.r. 174*l.* 4*s.* 1,355
80 to 86 (even), Dunlace-rd., u.t. 73 yrs., g.r. 16*l.* 16*s.*, w.r. 150*l.* 16*s.* 1,045
Homerton.—2 and 4, Hassett-rd., u.t. 57 yrs., g.r. 8*l.*, w.r. 67*l.* 12*s.* 535
15 and 17, Hassett-rd., u.t. 57 yrs., g.r. 8*l.*, w.r. 70*l.* 4*s.* 525
19 and 21, Hassett-rd., u.t. 47 yrs., g.r. 12*l.* 12*s.*, w.r. 67*l.* 12*s.* 525
Hackney Wick.—76, 78, and 80, White Post-lane, u.t. 56 yrs., g.r. 9*l.*, w.r. 93*l.* 12*s.* 530
Hoxton.—35 to 45 (odd), 49, 57, 59, and 63, Custance-st., u.t. 3 yrs., g.r. 36*l.* 7*s.*, w.r. 325*l.* .. 160
Holloway.—158, St. James'-rd., u.t. 31 yrs., g.r. 6*l.*, y.r. 36*l.* 225
34 and 36, Victoria-rd., y.r. 60*l.*; also i.g.r. of 5*l.*, u.t. 31 yrs., g.r. 15*l.* 465
Leyton.—42 and 44, Carlisle-rd., f., w.r. 36*l.* 8*s.* .. 340
Bow.—34 to 38, Gawthorne-st., u.t. 45 yrs., g.r. 18*l.* 13*s.*, w.r. 166*l.* 8*s.* 995
54, Robeson-st., u.t. 61 yrs., g.r. 3*l.* 10*s.*, w.r. 26*l.* 195
Clapton.—208 and 210, Rushmore-rd., u.t. 73 yrs., g.r. 10*l.*, w.r. 70*l.* 4*s.* 320
West Ham.—31 to 39 (odd), Boleyn-rd., u.t. 80 yrs., g.r. 16*l.* 5*s.*, w.r. 162*l.* 10*s.* 2,250
Manor Park.—65, Little Ilford-lane, u.t. 97 yrs., g.r. 5*l.*, w.r. 33*l.* 15*s.* 180
21, Dersingham-av., f., w.r. 28*l.* 12*s.* 240
Forest Gate.—3 and 5, Parliament-pl. (S), f., w.r. 41*l.* 12*s.* 410
Leyton.—1 to 8, Myrtle-ter., u.t. 97 yrs., g.r. 32*l.*, w.r. 243*l.* 2*s.* 1,700

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; 3 yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 13 0	per 1,000 alongside, in river
Rough Stocks and Grizzles	1 10 0	" " "
Facing Stocks	2 12 0	" " "
Shippers	2 5 0	" " "
Flettons	1 5 0	" at railway depôt
Red Wire Cuts	1 12 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	3 3 0	" " "
Best Blue Pressed Staffordshire	4 6 6	" " "
Do., Bullnose	4 11 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "

PRICES CURRENT (*Continued*).

BRICKS, &c.

	£ s. d.	
Double Stretchers	15 0 0	per 1,000 at railway depot.
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamfered, Squints	14 0 0	" " "
Seconds Quality		
White and Dipped Salt Glazed	2 0 0	" less than best.
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	31 0	per ton, delivered.
Best Ground Blue Lias Lime	22 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 10*s.* 6*d.* per yard, delivered.
Stourbridge Fire-clay in sacks, 27*s.* 0*d.* per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	2 11	per ft. cube, deld. rly. depot
Bath "	1 7	" "
Farleigh Down Bath	1 8	" "
Beer in blocks	1 6	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 3	" "
Red Mansfield "	2 4	" "
Hard York in blocks	2 10	" "
" " 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.
" " 6 in. Rubbed Ditto	3 0	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 2 in. self-faced Ditto	0 9½	" "
Hopton Wood (Hard Bed) in blocks	2	3 per ft. cube. deld. rly. depôt.
" " " 6 in. sawn both sides landings	2	7 per ft. super. deld. rly. depôt.
" " " 3 in. do.	1	2½ " "

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor	12 0 0	per 1000 of 1200 at rly. dep
" best seconds	11 10 0	" "
16×8 best "	8 17 6	" "
20×10 best blue Portmadoc	11 7 6	" "
16×8 best blue Portmadoc	8 5 0	" "
20×10 best Eureka unfading green	15 0 0	" "
20×12 " "	16 10 0	" "
18×10 " "	11 10 0	" "
16×8 " "	7 10 0	" "
20×10 permanent green	10 10 0	" "
16×8 " "	6 0 0	" "

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000, at rly. depôt.
Hip and valley tiles	3 7	per doz. " "
Best Broseley tiles	48 6	per 1,000 " "
Hip and valley tiles	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	80 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 10 0	16 0 0
Deals: best 3 by 9	13 10 0	15 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	10 10 0	11 10 0
Battens: best 2½ by 6 and 3 by 6	0 12 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in.	8 10 0	9 10 0
1½ by 4½ in. and 2 in by 5 in.	8 0 0	9 0 0
Foreign Sawn Boards— 1 in. by 12 in. by 12 in.	0 10 0	more than battens.
½ in.	1 0 0	"
Fir timber: Best middling Dantzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (50 ft.)	3 0 0	3 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	22 0 0	23 0 0
3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	20 0 0
" " 3 in. by 9 in.	16 10 0	18 10 0
Battens, 2½ in. and 2 in. by 7 in.	13 0 0	14 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	15 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	20 0 0	21 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	13 0 0	14 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0

[*See also page 285.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Technical Schools and Free Library	Ramsgate Corporation	50*l.*, 25*l.*, and 15*l.*	Nov. 29

CONTRACTS.

Nature of Work or Materials.	By whom Advertised	Forms of Tender, &c., Supplied by	Tenders to be delivered
Four Houses, Shop, &c., Tinker-lane, Barnsley		Wade & Turner, Architects, 10, Pitt-street, Barnsley	Sep. 30
Sewerage Works, Malin-road, Moville, Ireland		F. Nolan, Civil Engineer, care of J. M'Connell, Moville	do.
Fifty Houses, New Tredegar		G. Kenshole, Architect, Station-road, Bargoed	do.
Paving Works, Old Cock Yard, Halifax		Jackson & Fox, Architects, Rawson-street, Halifax	do.
Street Works, Abercynon	Mountain Ash (Glam) U.D.C.	J. Williams, Surveyor, Town Hall, Mountain Ash	do.
Causewaying Albert Quay	Aberdeen Harbour Commissioners	R. G. Nicol, Harbour Engineer, Aberdeen	do.
Concrete Wall, Eastcote, Ruislip	Uxbridge R.D.C.	E. Birks, Town Hall, Uxbridge	do.
Cottages, Darklands-road	Swadlincote U.D.C.	T. Kidd, Civil Engineer, Swadlincate	do.
School, Barton-on-Irwell		Austin & Paley, Architects, Castle Park, Lancaster	Oct. 1
Alterations to Chapel, Blaenavon	Littlehampton U.D.C.	F. Bennett, 1, Lower Wann-street, Blaenavon	do.
Quartzite Road Metal	Norwood (Middlesex) Sch. Brd.	A. Shelley, Town Offices, Littlehampton	do.
*School in Clifton-road, Southall	Brechin District Committee	Board's Architect, 22, Buckingham-street, Adelphi, W.C.	do.
Sewers, &c., Ferryden	Hove Town Council	J. Sim, Civil Engineer, Montrose	do.
Paving Works, Fourth-avenue, &c.	Kinsale (Ireland) R.D.C.	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Fourteen Cottages	Halifax Corporation	R. Evans, Engineer, 53, South Mall, Cork	do.
Additions to Laundry, Stoney Royal	Blackpool Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	do.
Kerbing, &c.	Weybridge U.D.C.	J. S. Brodie, Engineer, Town Hall, Blackpool	do.
Road Metal, &c.	Mirfield (Yorks) U.D.C.	J. S. Crawshaw, Surveyor, Council Offices, Weybridge	do
Council Room, &c.		F. H. Hare, Civil Engineer, Town Hall, Mirfield	do
Cattle and Sheep Mart, Llantwit Major, Glam.	Metropolitan Borough Woolwich	Mr. Miles, Solicitor, Cowbridge	Oct. 2
*Clearing Site for Municipal Buildings	Wolverhampton Hospital Comm.	A. Bunnwell Thomas	do.
Hospital, Park-road West, &c.	Ipswich Corporation	A. E. Painter, Architect, 43, Lichfield-street, Wolverhampton	do.
Granite Setts (6,000 tons)	Stockport Corporation	E. Buckham, Borough Surveyor, Town Hall, Ipswich	do.
Street Works, Myrtle-street, &c.	Croydon Corporation	J. Atkinson, Civil Engineer, St. Petersgate, Stockport	do.
Road Works, Lincoln-road	Wolverhampton Hosp. for Women	Borough Road Surveyor, Town Hall, Croydon	do.
*New Hospital	Mr. R. R. Bath	A. E. Painter, Architect, 43, Lichfield-street, Wolverhampton	do.
Stores, Coombe, Newlyn, Cornwall	Pencoed School Board	H. Maddern, Architect, 26, Clarence-street, Penzance	Oct. 3
Drainage Works		J. John, Pencoed, Bridgend, Glam.	do.
Four Houses, Old Church, Lightcliffe, Yorks		Walsh & Nicholas, Architects, Museum Chambers, Halifax	do.
Wain House, &c., Trevoar, Cornwall		G. Gow, Tregothnan Office, Truro	Oct. 4
Two Villas, Skircoat Green-road, Halifax		Buckley & Son, Architects, Tower Chambers, Halifax	do.
Alterations to Shops, &c., High-st., Weston-super-Mare	Weston-super-Mare U.D.C.	Wilde & Fry Architects, Weston-super-Mare	do.
Cabmen's Shelters	Windsor Town Council	H. Nettleton, Surveyor, Town Hall, Weston-super-Mare	do.
House at Cemetery	Wirral R.D.C.	Borough Surveyor, Town Hall, Windsor	do.
Road Works, Gayton Hill-road, Heswall	North Derbyshire Hospital Com.	T. Davies, 35, Kingsland-road, Birkenhead	do.
Three Isolation Hospitals	Hoole U.D.C.	G. E. Bolshaw, Architect, 189, Lord-street, Southport	do.
Street Works, Canadian-avenue, &c.		A. E. Caldecutt, 17, Newgate-street, Chester	do.
School, Dynevor, Skewen, Wales	Margate Corporation	Martyn & Lloyd, Architects, Dynevor Post Office, Neath	Oct. 6
*Laying Main (Waterworks)	Grimsby Corporation	Albert Latham, Engineer, Municipal Buildings, Margate	do.
Street Works, Pasture-street, &c.	Farnborough U.D.C.	H. G. Whyatt, Civil Engineer, Town Hall-square, Grimsby	do.
Sewage Disposal Works	Margate Town Council	J. R. Hargreaves, Engineer, Town Hall, Farnborough	do.
Laying Main (24,000 yards)	Bishop Auckland R.D.C.	A. Latham, Civil Engineer, Municipal Buildings, Margate	do.
Sewerage Works, Leasingthorne, &c.	Huddersfield Corporation	C. Johnson, Surveyor, Crofton House, Bishop Auckland	do.
Masonry Tank, Shepley	Bromley U.D.C.	G. & C. H. Crowther, Civil Engineer, 38, New-st., Huddersfield	do.
*Sewering, Levelling, Paving, &c., of High-street	Bootle (Lancs) Corporation	Office of Council's Surveyor, Bromley, Kent	Oct. 7
Road Works, Stanley-road, &c.	North-Eastern Railway Co.	Borough Engineer, Town Hall, Bootle	do.
Subway, Starbeck Railway Station	Middlesex County Council	W. J. Cudworth, Engineer, York	do.
*Permanent Way (for Elec. Traction), Bridge Work, &c.	Leyton U.D.C.	County Engineer, Middlesex Guildhall, Westminster, S.W.	do.
*Wrought Iron Fencing, &c. at James-lane Rec.		Council's Surveyor, Town Hall, Leyton	do.
*Erection of Six Maisonettes, Wandsworth Bridge-rd.	Corporation of London	F. & W. Stocker, Architects, 90 and 91, Queen-street, E.C.	Oct. 10
*Erection, New Baths, Artisans' Dwellings, Stoney-lane	do.	Office of Engineer to the Corporation, Guildhall, E.C.	do.
*New Sanitary Fittings, Artisans' Dwellings, Stoney-lane	Beckenham U.D.C.	do.	do.
*Road Widening and Paving Works	Devonport Corporation	Council's Surveyor, Beckenham	Oct. 13
Embankment, &c., Camelshead	Margate Town Council	Borough Surveyor, Town Hall, Devonport	do.
Flint and Granite Road Metal	County Borough of West Ham	E. A. Borg, Borough Surveyor, Town Hall, Margate	do.
*Making-up Inniskilling, Jedburgh, &c., Roads	Bournemouth Corporation	Borough Engineer, Town Hall, West Ham, E.	Oct. 14
Road Works, St. Leonards-road, &c.	Middlesex County Council	F. W. Lacey, Engineer, Town Hall, Bournemouth	do.
*New Court House, Harrow	Bootle R.D.C.	County Engineer, Middlesex Guildhall, Westminster, S.W.	do
Waterworks	Stroud Joint Hospital Board	R. Pickering, Surveyor, 11, Lowther-street, Whitehaven	Oct. 16
*Erection of Isolation Hospital	Bury (Lancs) Water Board	G. P. Milnes, Architect, Stroud	Oct. 17
Storage Reservoir, &c.	Burton-on-Trent Corporation	J. Cartwright, Civil Engineer, Peel Chambers, Bury	Oct. 20
*Car Depot for Tramways	Admiralty	Kincaid, Waller, & Manville, Engineers, 29, St. George-st., S.W.	Oct. 22
*New Coast Guard Buildings, near Dover	Guernsey Gaslight Co.	Director of Works Department, Admiralty, W.C.	Oct. 24
Gasholder and Tank	Antrim County Council	Manager, Gasworks, Guernsey	No date
Road Widening, Whitehead, &c.	Shipston-on-Stour Gas Co.	County Surveyor, County Court House, Belfast	do.
Gas Main		H. Sale, Gas Offices, Shipston	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Drainage Inspector	Eastleigh & Bishopstoke U.D.C.	2*l.* per week	Oct. 1
*Clerk of Works	Menai Bridge U.D.C.	Not stated	do
*Surveyor	Amersham R.D.C.	120*l.*, &c	Oct. 6
*Storekeeper	London County Council	2*l.* 2*s.* per week	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv* *Contracts, pp. iv vi. viii & x.* *Public Appointments, xix.*

PRICES CURRENT (*Continued*).

WOOD.

	At per standard. £ s. d.	£ s. d.
Petersburg—		
Third yellow deals, 3 in. by 11 in.	12 10 0	13 10 0
Do. 3 in. by 9 in.	12 0 0	13 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg :—		
First white deals, 3 in. by 11 in.	14 0 0	15 0 0
" " 3 in. by 9 in.	13 0 0	14 0 0
Battens	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 0 0	14 0 0
" " 3 in. by 9 in.	12 0 0	13 0 0
" " " battens	9 10 0	10 10 0
Pitch-pine : deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 1	0 0 0
Yellow Pine—First, regular sizes	32 0 0	33 10 0
Broads (12 in. and up)	2 0 0 more.	
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Dantzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 0
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7½	0 0 8
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 3 0	0 3 6
Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 0	0 16 6
1 in. by 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 7 in. yellow, planed and matched	0 15 0	1 0 0
1 in. by 7 in. white, planed and shot	0 11 0	0 12 6
1 in. by 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 7 in. white, planed and matched	0 13 6	0 15 6

6 in. at 6d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Fitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 10 0
" " galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Sheet Iron, Galvanised, flat, best quality :—		
Ordinary sizes to 20 g.	16 0 0	- - -
" " 22 g. and 24 g.	16 10 0	- - -
" " 26 g.	18 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 12 6	- - -
Pipe in coils	14 2 6	- - -
Soil Pipe	16 12 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	24 5 0	- - -
Silesian	24 0 0	- - -
COPPER—		
Strong Sheet per lb	0 0 10	- - -
Thin "	0 0 11	- - -
Copper nails "	0 0 11	- - -
BRASS—		
Strong Sheet "	0 0 9	- - -
Thin "	0 0 10	- - -
TIN—English Ingots "	0 1 3½	- - -
SOLDER—Plumbers' "	0 0 6½	- - -
Tinmen's "	0 0 5½	- - -
Blowpipe "	0 0 9½	- - -

PRICES CURRENT (*Continued*).

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2d. " "
21 oz. thirds	3½d. " "
" fourths	2¾d. " "
26 oz. thirds	4½d. " "
" fourths	3½d. " "
32 oz. thirds	5½d. " "
" fourths	4½d. " "
Fluted sheet, 15 oz.	3d. " "
" 21 "	4d. " "
½ Hartley's Rolled Plate	1½d. " "
⅝ " " "	2½d. " "
¾ " " "	2¾d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 2 8
" " " in drums	"	0 2 11
Boiled " " in pipes or barrels	"	0 2 10
" " " in drums	"	0 3 1
Turpentine, in barrels	"	0 2 10
" in drums	"	0 3 0
Genuine Ground English White Lead	per ton	21 0 0
Red Lead, Dry	"	20 0 0
Best Linseed Oil Putty	per cwt.	0 2 6
Stockholm Tar	per barrel	1 12 6

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 2 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 6
Superfine Hard-drying Oak, for Seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Superfine Pale Copal Body	1 4 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 18 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 2 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 16 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BARNARD CASTLE.—For the execution of water supply works, Bowes, for the Startforth Rural District Council. Mr. J. E. Parker, C.E., Post Office Chambers, Newcastle-on-Tyne :—

J. Hardy	£2,368 0 0	C. Hedley	£1,427 12 8
G. Wills	2,111 2 0	Bushey & Sons	1,356 13 8
T. Bell	2,038 3 0	Chas. E. Raine, Barnard Castle*	1,348 12 0
J. & H. Lee	1,844 2 6	[Engineer's Estimate]	1,310 0 0
Smart Walker	1,780 0 0		
Jackson & Sons	1,612 11 3		
E. W. Jackson	1,525 7 0		
A. E. Hobbs	1,551 3 9		

BLAENAVON (Mon).—For the erection of two houses, Caldicot. Mr. E. Blewitt, architect, Blaenavon, Mon. :—

J. Hatherly	£1,087	C. Shopland, Newport, Mon.*	£460
Leadbeater Bros.	639		
W. T. Sier	550		

BRITON FERRY.—For the erection of a club building for the Working Men's Club and Institute. Mr. H. Alex. Clarke, architect, Briton Ferry :—

Thos. Waters	£1,472	L. Gower, Briton Ferry*	£1,295

Architect's estimate, £1,350.

CHESTERFIELD.—For the erection of infirmary, nurses' home, &c., at the workhouse, for the Guardians. Messrs. Rollinson & Son, architects, 13, Corporation-street, Chesterfield :—

J. Fidler	£45,634 0 0	Lowe & Son	£41,561 1 9
Shillitoe & Son	44,800 0 0	Hodson & Son	39,997 17 8
Vickers, Ltd.	43,482 17 3	W. Maule, Nottingham*	39,519 0 0
Vickers & Son	43,000 0 0		
F. Lee	42,690 0 0		

DOWNE (Kent).—For additions and alterations to a private house. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C. :—

W. Borer* £173 17

EPSOM.—For alterations and fitting-up shop, High-street, for the International Tea Company, Ltd. Messrs. William Eve & Sons, architects, 10, Union-court, Old Broad-street, E.C. :—

Jones & Son	£1,930	Edgoose	£1,818
Soole & Son	1,870	Barker	1,775
Lascelles & Co.	1,865	F. & H. F. Higgs	1,740
Watts Johnson & Co.	1,820	Rolls & Taylor	1,697
		Saunders	1,560

FEATHERSTONE (Yorks).—For the extension of North Featherstone-lane Schools, for the School Board. Mr. W. Hamilton Fearnley, architect, Station-lane, Featherstone :—

W. Barton	£2,120 0 0	G. Clements, Featherstone*	£1,818 17 5
M. Dixon	2,097 10 0		
Jackson & Dumberline	1,999 10 0		

FELIXSTOWE.—For the construction of sea-walls, groynes, promenade, and other works, for the Felixstowe District Council. Mr. John Russell, M.Inst.C.E., 15, Victoria-street, S.W. :—

T. W. Pedrette	£19,762 0 6	P. W. Symmons	£15,326 8 0
Easton, Gibb, & Son	18,983 5 6	H. J. Linrell	15,219 0 0
Geo. Double	16,946 13 8	Fasey & Son	14,568 9 8
Grabwell & Co.	16,422 12 9	Hayward & Co.	14,250 0 0
The Case Sea Defence Synd., Ltd.	16,329 3 8	J. Moffat	14,244 15 0
Bradshaw & Co.	15,439 18 6	J. C. Truman	13,900 0 0
		C. Durrant	13,909 19 6
		Moran & Son	13,276 5 2
		Cookes & Co., Westminster*	12,906 3 2

HENDON.—For corrugated fire-escape shed, Institute-road, Hendon. Mr. S. Slater Grimley, Engineer and Surveyor to the Council :—

T. J. Hawkins	£96 10 0
Norton Bros. & Co.	92 0 0
Fredk. King	68 12 6

HERTFORD.—For additions, &c., to porter's lodge at workhouse, for the Guardians :—

Ginn & Son	£498	E. Salmon	£46

ILFRACOMBE.—For the construction of masonry intakes, &c., Challacombe, for the Urban District Council. Mr. O. M. Prouse, C.E., Town Hall, Ilfracombe :—

W. C. Shaddock	£12,400	J. Alderman, West Looe, Cornwall*	£6,197
J. Dickson	9,135		
O. G. Osenton	6,862		

LONDON.—For pair of cottages, sewage outfall works, Renters-lane, Hendon, N.W. Mr. S. Slater Grimley, Engineer and Surveyor to the Council :—

F. King	£1,080 0	J. & W. Easterbrook	£937 0
Grover & Sons	1,065 0	Turpie Bros.	917 19
W. Tout	988 16	F. Perren	825 12

LONDON.—For alterations and re-construction of present lounge bar at Swan and Sugar Loaf Hotel, Brighton-road, Croydon, for Mr. J. E. Brown (structural alterations only). Mr. F. Windsor, architect, 9 and 10, Bank-buildings, George-street, Croydon :—

Hanscombe & Smith	£324	Huntley, Bros.	£295
Horrocks	310	Gowman*	284
Page	303		

LONDON.—For boundary fencing, &c. at the Hendon Council Offices. Mr. S. Slater Grimley, Engineer to the Council :—

	Oak Carriage Entrance Gates per pair.	Wicket Gates each.	Oak Boundary Fencing (ramped).	Park Pale Fencing.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Braggins & Co	41 14 6	16 7 0	101 6 4	14 15 0
E. C. White	28 10 0	12 5 0	45 0 0	7 10 0
Rowland Bros Stratford	24 12 8	9 13 6	34 8 6	9 10 6

[*See also next page.*

NOTTINGHAM.—For the erection of refuse destructor and stables, Wollaton-road, Radford, for the City Council. Mr. Arthur Brown, C.E., Guildhall, Nottingham :—

Contract No. 1.

G. A. Pillatt	£5,918 13
Woodsend	5,649 0
Wm. Maule	5,510 0
T. Barlow	5,415 0
Vickers & Son	5,149 0
J. H. Williamson	5,090 0
Hutchinson & Son, Gordon-road, Nottingham*	4,820 0

[All of Nottingham.]

Contract No. 2.

Constructional Engineering Co.	£1,986 0 0
Handyside & Co.	1,042 17 3
Sands & Sons	1,041 0 0
T. W. Ward	1,030 0 0
Westwood & Wrights	993 8 0
Newton, Chambers & Co.	960 0 0
Jesse Tildesley, Ltd.	924 17 6
Baxendale Bros.	924 0 0
Horsley Co., Ltd., Tipton, Staffs*	872 13 2

ORPINGTON (Kent).—For decorations to Village Hall, for Mr. A. Brown. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C. :—

W. R. Taylor* £160

OTLEY (Yorks).—For the execution of street works, Jennett's-crescent, &c., for the Urban District Council. Mr. J. E. Sharpe, engineer, Council Offices, Otley :—

Joseph Hannam, 39, North-street, Otley* £698 4 3

ST. PAUL'S CRAY (Kent).—For the erection of four cottages. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C. :—

F. Wood	£1,358 16	T. Knight*	£1,349 0
Somerford & Son	1,420 0	C. Dabner	1,136 0

SOUTHOWRAM (Yorks.).—For the construction of main sewage works, &c., Cromwell Wood, for the Council. Mr. F. Massie, C.E., Tetley House, Wakefield :—

Graham & Sons	£1,300 0 0	Parkin & Co.	£986 19 0
Barker Bros.	1,267 0 0	W. Dolemen	976 9 10
Bedford Bros.	1,190 0 0	Ward & Tetley	934 6 9
J. Bentley	1,106 0 0	Egan & Sons	909 14 1
Joseph Brook	1,067 3 9	Hill & White, Huddersfield*	883 13 4
Henry Tyson	1,060 17 6	A. C. Harris	851 0 8
Marshall & Rushworth	988 10 9		

STANLEY (Yorks.).—For the execution of sewerage works, &c., Loe Moor, for the Urban District Council. Mr. Frank Massie, C.E., Tetley House, Wakefield :—

Higgins & Pashley	£401 10 0	S. Hall	£355 10 4
Binks Bros.	350 0 0	T. & G. Wilson, Wakefield*	238 11 8
A. C. Harris	322 13 4		

TRING (Herts).—For the execution of street works, &c., High-street and Frogmore-street, for the Urban District Council :—

Taylor & Smith, Little Missenden* £920

WALSALL.—For the erection of school buildings and house, North Walsall, for the School Board. Mr. H. E. Lavender, architect, Bridge-street, Walsall. Quantities by architect :—

Williams & Oakley	£12,227 13	J. Dallow	£9,850 0
L. Jones	11,693 0	W. Wistance	9,740 0
W. Hopkins	11,600 0	W. H. Gibbs	9,670 0
Kendrick & Son	10,925 0	J. Mallin	9,559 0
G. H. Marshall	10,509 0	Lowe & Sons	9,387 0
S. Wooton	10,437 0	Thos. Tildesley, Willenhall*‡	9,198 0
M. A. Lynex	9,995 0		

‡ Without heating apparatus.

WAKEFIELD.—For the erection of five cottages, Carlton, for the Leeds Industrial Co-operative Society, Ltd. :—

Binks Bros., Outwood, near Wakefield* £625 13 0

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"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

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